TN
24
C3
A3
no.64-66

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

CALIFORNIA STATE MINING BUREAU
FERRY BUILDING, SAN FRANCISCO
McN. HAMILTON State Mineralogist

San Francisco] BULLETIN No. 65 [September, 1913

COMPLIMENTS OF
F. McN HAMILTON
STATE MINERALOGIST

# Mineral Production for 1912

By E. S. BOALICH
Statistician

FRIEND WM. RICHARDSON, SUPERINTENDENT OF STATE PRINTING
SACRAMENTO, CALIFORNIA
1913

LIBRARY
UNIVERSITY OF CALIFORNIA

CALIFORNIA STATE MINING BUREAU
FERRY BUILDING, SAN FRANCISCO
W. McN. HAMILTON State Mineralogist

San Francisco] BULLETIN No. 65 [September, 1913

# Mineral Production for 1912

By E. S. BOALICH
Statistician




FRIEND WM. RICHARDSON, SUPERINTENDENT OF STATE PRINTING
SACRAMENTO, CALIFORNIA
1913

# TABLE OF CONTENTS.

## CHAPTER I.


Page

SUMMARY OF THE MINERAL INDUSTRY IN CALIFORNIA DURING THE YEAR 1912 ---- 5

TABULATION OF THE MINERAL PRODUCTION FOR 1912, AMOUNT AND VALUE ---- 7

TABLE SHOWING COMPARATIVE VALUE OF MINERAL PRODUCTION, 1910, 1911, 1912 ---- 8

TABLE SHOWING COMPARATIVE MINERAL PRODUCTION OF THE VARIOUS COUNTIES IN CALIFORNIA FOR 1910, 1911, 1912 ---- 9


## CHAPTER II.


FUELS—

Coal ---- 11

Natural Gas ---- 11

Petroleum ---- 12

Total Petroleum Production, 1875–1912 ---- 14


## CHAPTER III.


METALS—

Antimony ---- 15

Copper ---- 15

Gold ---- 16

Total Gold Production, 1848–1912 ---- 16

Iron ---- 18

Lead ---- 18

Molybdenum ---- 19

Platinum ---- 19

Quicksilver ---- 19

Silver ---- 20

Tungsten ---- 20

Tin ---- 21

Vanadium ---- 21

Zinc ---- 21


## CHAPTER IV.


STRUCTURAL MATERIALS—

Asphalt ---- 22

Bituminous Rock ---- 22

Brick ---- 23

Cement ---- 25

Total Cement Production, 1891–1912 ---- 25

Chrome ---- 25

Crushed Rock. (*See* Stone Industry.)

Granite. (*See* Stone Industry.)

Lime ---- 26

Magnesite ---- 26

Marble ---- 27

Onyx and Travertine ---- 27

Paving Blocks. (*See* Stone Industry.)

Sandstone ---- 27

Serpentine ---- 28

Slate ---- 28

Stone Industry ---- 28

Travertine. (*See* Onyx.)

## CHAPTER V.


INDUSTRIAL MATERIALS— Page

Asbestos ---- 34
Barytes ---- 34
Bauxite ---- 34
Clay ---- 35
Feldspar ---- 35
Fuller's Earth ---- 36
Gems ---- 36
Graphite ---- 37
Gypsum ---- 38
Infusorial Earth ---- 38
Limestone ---- 39
Manganese ---- 39
Mica ---- 40
Mineral Paint ---- 40
Mineral Water ---- 40
Pumice ---- 41
Pyrite ---- 41
Sand, Glass ---- 42
Soapstone ---- 42
Sulphur ---- 42
Talc. (*See* Soapstone.)
Tufa. (*See* Pumice.)


## CHAPTER VI.


SALINES—

Borax ---- 43
Nitrates ---- 43
Potash ---- 43
Salt ---- 43
Soda ---- 44


## CHAPTER VII.

### MINERAL PRODUCTION BY COUNTIES.


| | Page | | Page |
|---|---|---|---|
| Alameda | 45 | Placer | 53 |
| Alpine | 45 | Plumas | 53 |
| Amador | 45 | Riverside | 54 |
| Butte | 46 | Sacramento | 54 |
| Calaveras | 46 | San Benito | 54 |
| Colusa | 46 | San Bernardino | 55 |
| Contra Costa | 46 | San Diego | 55 |
| Del Norte | 47 | San Francisco | 55 |
| El Dorado | 47 | San Joaquin | 56 |
| Fresno | 47 | San Luis Obispo | 56 |
| Glenn | 48 | San Mateo | 56 |
| Humboldt | 48 | Santa Barbara | 57 |
| Imperial | 48 | Santa Clara | 57 |
| Inyo | 48 | Santa Cruz | 57 |
| Kern | 49 | Shasta | 58 |
| Kings | 49 | Sierra | 58 |
| Lake | 49 | Siskiyou | 58 |
| Lassen | 49 | Solano | 59 |
| Los Angeles | 49 | Sonoma | 59 |
| Madera | 50 | Stanislaus | 59 |
| Marin | 50 | Sutter | 59 |
| Mariposa | 50 | Tehama | 60 |
| Mendocino | 51 | Trinity | 60 |
| Merced | 51 | Tulare | 60 |
| Modoc | 51 | Tuolumne | 60 |
| Mono | 51 | Ventura | 61 |
| Monterey | 52 | Yolo | 61 |
| Napa | 52 | Yuba | 61 |
| Nevada | 52 | Unapportioned | 61 |
| Orange | 53 | | |

APPENDIX ---- 62

# MINERAL INDUSTRY, CALIFORNIA, 1912.

Data Compiled from Direct Returns from Producers in Answer to Inquiries sent out by California State Mining Bureau, Ferry Building, San Francisco.

## CHAPTER ONE.

Taking the mineral industry in California as a whole the year 1912 was one of unexampled progress and prosperity. The greatest single product, petroleum, excelled even the remarkable rate of growth which it has manifested during the past ten years. While the average price per barrel received for crude oil at the wells showed a slight decline as compared with that of the previous year, the consumption increased at a greater rate than the production, and the threatened oversupply, which seemed to be imminent at the end of 1911, was entirely dissipated. Development of the light gravity oil districts of the State has been active and most encouraging results have ensued. This fact, taken with the ever growing demand for crude petroleum and all its derivatives has given an added impetus to the industry and the present trend of both production and price is decidedly upward. Petroleum leads all other mineral products of the State by a wide margin, the value for 1912 being $41,868,344.

Next in importance comes gold with an output of $19,713,478. The great deep mines of the State maintain a steady output which is nothing less than remarkable. At several properties extensive development work has been done during the year with an idea of determining the probability of obtaining continued values at depth, with most satisfying results. While the zenith of the dredge production is probably at hand, increased efficiency in methods has offset the fact that the richest of the gravel deposits have been rather completely worked out. There is at present nothing to indicate any decrease in California's output of the precious metal.

Cement ranks third with an output valued at $6,074,661; copper is number four on the list with $5,638,049.

Crushed rock, brick and borax follow, in the order of their importance, each with a production worth over the million dollar mark.

Every one of California's fifty-eight counties contain mineral deposits of some description. During 1912 fifty-six counties produced commercially one or more mineral substance.

The total value of these minerals was $88,972,385, as compared with $87,497,879 for 1911, an increase of $1,474,506. These figures do not include value of asphalt because of the fact that the asphalt used in the State is a refined product and as far as possible all data in this report refers to CRUDE MATERIALS, WITH VALUES OF SAME AT THE PROPERTY. In this connection, however, it is worthy of note that the asphalt production for 1912 amounted to approximately 250,000 tons with a total value of $2,500,000. This item is often included in estimating the mineral output for the State and it is well to bear in mind the fact that it is omitted in the annual totals above quoted.

While the more prominent and well known minerals show a consistently increasing production, it is gratifying to note that the less common metals and industrial materials are also coming in for their share of attention. Zinc, tungsten, marble, soapstone, pumice, and many other substances exhibit an increased production. The immense iron deposits practically untouched as yet; the mountains of building stone of every description; the inexhaustible deposits of oil, gold and copper; the millions of acres of saline deposits in the desert regions, all go to prove the truth of the statement that California's wonderful record as a mineral producer will increase, rather than diminish, for many years to come.

Borax, magnesite and chrome production for the United States come solely from California. Eighty per cent of the domestic supply of quicksilver is mined here; the same figures hold true in the case of platinum; tungsten is produced in but two or three other States. California leads all other states in the Union in the value of petroleum and gold produced; is first of all states west of the Mississippi in the value of her total mineral production, and is only outranked by a few of the great iron and coal producing states of the East.

Kern leads all other counties in petroleum production; Amador and Yuba are close rivals for first place in gold output; Shasta produces 80 per cent of the copper total; Los Angeles leads in brick and crushed rock; Inyo is first in borax, lead, soda and zinc; San Benito is first in quicksilver production; San Diego County produces half of the gems found in the State; Placer is first in granite and building stone; Santa Cruz in lime; Tulare in magnesite; Tuolumne in marble; Alameda in salt, and Colusa in sandstone.

The following table shows the yield of mineral substances of California for 1912 as compiled from the returns received at the State Mining Bureau, San Francisco, in answer to inquiries sent to producers:

| Substance | Amount | Value |
|---|---|---|
| Asbestos | 90 tons | $2,700 00 |
| Barytes | 564 tons | 2,812 00 |
| Bituminous rock | 44,073 tons | 87,467 00 |
| Borax | 42,135 tons | 1,122,713 00 |
| Brick | 337,233 M | 2,940,290 00 |
| Cement | 6,198,634 bbls. | 6,074,661 00 |
| Chrome | 1,270 tons | 11,260 00 |
| Clay | 199,605 tons | 215,683 00 |
| Coal | 14,848 tons | 39,092 00 |
| Copper | 34,169,997 lbs. | 5,638,049 00 |
| Feldspar | 1,382 tons | 6,180 00 |
| Fuller's earth | 876 tons | 6,500 00 |
| Gems | | 23,050 00 |
| Gold | | 19,713,478 00 |
| Gypsum | 37,529 tons | 117,388 00 |
| Infusorial earth | 4,129 tons | 17,074 00 |
| Iron ore | 2,508 tons | 2,508 00 |
| Lead | 1,370,067 lbs. | 61,653 00 |
| Lime | 522,118 bbls. | 464,440 00 |
| Limestone | 613,375 tons | 570,248 00 |
| Magnesite | 10,512 tons | 105,120 00 |
| Manganese | 22 tons | 400 00 |
| Marble | 27,820 cu. ft. | 74,120 00 |
| Mineral paint | 300 tons | 1,800 00 |
| Mineral water | 2,497,794 gals. | 529,384 00 |
| Natural gas | | 940,076 00 |
| Petroleum | 89,689,250 bbls. | 41,868,344 00 |
| Platinum | 603 oz. | 19,731 00 |
| Pumice | 100 tons | 2,500 00 |
| Pyrite | 69,872 tons | 203,470 00 |
| Quicksilver | 20,600 flasks | 866,024 00 |
| Salt | 185,721 tons | 383,370 00 |
| Sand, glass | 13,075 tons | 15,404 00 |
| Sandstone | 66,487 cu. ft. | 22,574 00 |
| Silver | | 799,584 00 |
| Soapstone | 1,750 tons | 7,350 00 |
| Soda | 7,200 tons | 37,094 00 |
| Stone industry† | | 5,473,928 00 |
| Tungsten§ | 8,042 tons | 206,000 00 |
| Zinc | 4,331,391 lbs. | 298,866 00 |
| Total value | | $88,972,385 00 |

†Including granite, macadam, rubble, paving blocks, sand and gravel.
§Quantity of crude ore mined.

The following table shows the comparative value of minerals produced in California during the years 1910, 1911, and 1912:

| Substance | 1910 | 1911 | 1912 |
|---|---|---|---|
| Asbestos | $20,000 00 | $500 00 | $2,700 00 |
| Barytes | 5,640 00 | 2,207 00 | 2,812 00 |
| Bituminous rock | 165,711 00 | 117,279 00 | 87,467 00 |
| Borax | 1,177,960 00 | 1,456,672 00 | 1,122,713 00 |
| Brick | 2,934,731 00 | 2,638,121 00 | 2,940,290 00 |
| Cement | 7,485,715 00 | 9,085,625 00 | 6,074,661 00 |
| Chrome | 9,707 00 | 14,197 00 | 11,260 00 |
| Clay | 324,099 00 | 252,759 00 | 215,683 00 |
| Coal | 23,484 00 | 18,297 00 | 39,092 00 |
| Copper | 6,680,641 00 | 4,604,753 00 | 5,638,049 00 |
| Crushed rock | [1] | 3,610,357 00 | [2] |
| Feldspar | 5,720 00 | 4,560 00 | 6,180 00 |
| Fuller's earth | 3,820 00 | 5,294 00 | 6,500 00 |
| Gems | 237,475 00 | 51,824 00 | 23,050 00 |
| Gold | 19,715,440 00 | 19,738,908 00 | 19,713,478 00 |
| Granite | 417,898 00 | 355,742 00 | [3] |
| Gypsum | 129,152 00 | 101,475 00 | 117,388 00 |
| Infusorial earth | 17,617 00 | 19,670 00 | 17,074 00 |
| Iron ore | 900 00 | 558 00 | 2,508 00 |
| Lead | 134,082 00 | 63,173 00 | 61,653 00 |
| Lime | 1,058,891 00 | 390,988 00 | 464,440 00 |
| Limestone | [4] | 452,790 00 | 570,248 00 |
| Macadam | 1,104,526 00 | [5] | [6] |
| Magnesite | 113,887 00 | 67,430 00 | 105,120 00 |
| Manganese | 4,235 00 | 40 00 | 400 00 |
| Marble | 50,200 00 | 54,103 00 | 74,120 00 |
| Mineral paint | 2,040 00 | 1,184 00 | 1,800 00 |
| Mineral water | 522,009 00 | 590,654 00 | 529,384 00 |
| Natural gas | 1,676,367 00 | 491,859 00 | 940,076 00 |
| Paving blocks | 198,916 00 | 210,819 00 | [7] |
| Petroleum | 37,689,542 00 | 40,552,088 00 | 41,868,344 00 |
| Platinum | 8,386 00 | 14,873 00 | 19,731 00 |
| Pumice | None | None | 2,500 00 |
| Pyrite | 179,862 00 | 182,954 00 | 203,470 00 |
| Quicksilver | 799,002 00 | 879,205 00 | 866,024 00 |
| Rubble | 1,673,164 00 | [8] | [9] |
| Salt | 395,417 00 | 324,255 00 | 383,370 00 |
| Sand, glass | 8,165 00 | 8,672 00 | 15,404 00 |
| Sand, quartz | 10,100 00 | None | None |
| Sandstone | 80,443 00 | 127,314 00 | 22,574 00 |
| Silver | 993,646 00 | 673,336 00 | 799,584 00 |
| Slate | 8,000 00 | None | None |
| Soapstone | 7,260 00 | None | 7,350 00 |
| Soda | 11,862 00 | 52,887 00 | 37,094 00 |
| Stone industry* | | | 5,473,928 00 |
| Tungsten | 208,245 00 | 127,706 00 | 206,000 00 |
| Zinc | None | 152,751 00 | 298,866 00 |
| Totals | $86,293,957 00 | $87,497,897 00 | $88,972,385 00 |
| Asphalt | 2,125,122 00 | 2,250,000 00 | 2,500,000 00 |
| Total including asphalt | $88,419,079 00 | $89,747,879 00 | $91,472,385 00 |

[1]Given as macadam and rubble. [2] [3] [6] [7] [9]Included in "stone industry." [4]Included in lime. [5] [8]Included in crushed rock.

*Stone industry includes all crushed rock, granite, paving blocks, etc.

The following tabulation shows the comparative mineral production of the various counties of the State during the three years, 1910, 1911, and 1912:

| County | 1910 | 1911 | 1912 |
|---|---|---|---|
| Alameda | $1,205,387 00 | $799,639 00 | $794,961 00 |
| Alpine | | | * |
| Amador | 2,785,767 00 | 2,993,670 00 | 2,925,202 00 |
| Butte | 2,529,179 00 | 2,406,856 00 | 2,403,675 00 |
| Calaveras | 2,026,166 00 | 1,970,059 00 | 2,051,781 00 |
| Colusa | 148,005 00 | 138,227 00 | 70,165 00 |
| Contra Costa | 484,923 00 | 594,256 00 | 829,811 00 |
| Del Norte | 5,845 00 | 1,750 00 | 3,950 00 |
| El Dorado | 194,631 00 | 153,918 00 | 122,001 00 |
| Fresno | 9,505,699 00 | 9,711,463 00 | 8,897,685 00 |
| Glenn | 34,020 00 | 51,430 00 | 32,950 00 |
| Humboldt | 77,437 00 | 76,858 00 | 268,116 00 |
| Imperial | 97,656 00 | 105,044 00 | 30,000 00 |
| Inyo | 704,473 00 | 710,033 00 | 483,330 00 |
| Kern | 19,614,014 00 | 21,176,534 00 | 23,097,003 00 |
| Kings | 10,085 00 | 900 00 | 1,850 00 |
| Lake | 142,427 00 | 100,296 00 | 123,286 00 |
| Lassen | 83,152 00 | [1] | |
| Los Angeles | 5,525,317 00 | 5,407,863 00 | 5,594,513 00 |
| Madera | 133,766 00 | 80,201 00 | 112,285 00 |
| Marin | 183,885 00 | 232,731 00 | 122,200 00 |
| Mariposa | 346,245 00 | 175,752 00 | 214,294 00 |
| Mendocino | 500 00 | 1,600 00 | 300 00 |
| Merced | 71,064 00 | 49,548 00 | 45,000 00 |
| Modoc | 5,513 00 | 20,238 00 | 29,187 00 |
| Mono | 445,115 00 | 298,405 00 | 454,268 00 |
| Monterey | 162,523 00 | 74,536 00 | 132,749 00 |
| Napa | 244,410 00 | 220,399 00 | 266,708 00 |
| Nevada | 2,553,204 00 | 2,219,214 00 | 2,108,543 00 |
| Orange | 3,220,164 00 | 4,113,585 00 | 4,518,275 00 |
| Placer | 583,659 00 | 539,246 00 | 881,537 00 |
| Plumas | 200,870 00 | 230,010 00 | 196,997 00 |
| Riverside | 507,406 00 | 622,489 00 | 782,627 00 |
| Sacramento | 1,660,970 00 | 2,109,678 00 | 2,171,399 00 |
| San Benito | 584,343 00 | 558,846 00 | 494,068 00 |
| San Bernardino | 447,836 00 | 710,108 00 | 1,428,057 00 |
| San Diego | 374,874 00 | 419,008 00 | 305,683 00 |
| San Francisco | 120,126 00 | 119,636 00 | 151,147 00 |
| San Joaquin | 376,149 00 | 189,593 00 | 210,040 00 |
| San Luis Obispo | 215,322 00 | 75,556 00 | 31,564 00 |
| San Mateo | 279,872 00 | 233,985 00 | 216,582 00 |
| Santa Barbara | 5,334,960 00 | 3,411,107 00 | 4,111,258 00 |
| Santa Clara | 420,782 00 | 461,611 00 | 557,585 00 |
| Santa Cruz | 400,794 00 | 338,814 00 | 270,207 00 |
| Shasta | 8,203,677 00 | 5,406,461 00 | 5,825,819 00 |
| Sierra | 313,365 00 | 467,117 00 | 736,423 00 |
| Siskiyou | 527,178 00 | 553,037 00 | 598,713 00 |
| Solano | 255,169 00 | 188,848 00 | 203,073 00 |
| Sonoma | 283,113 00 | 238,610 00 | 346,306 00 |
| Stanislaus | 223,061 00 | 315,219 00 | 295,673 00 |
| Tehama | 4,400 00 | 500 00 | 1,300 00 |
| Trinity | 508,433 00 | 620,950 00 | 733,755 00 |
| Tulare | 206,050 00 | 158,335 00 | 142,890 00 |
| Tuolumne | 755,591 00 | 1,240,734 00 | 1,353,706 00 |
| Ventura | 392,974 00 | 362,810 00 | 595,399 00 |
| Yuba | 3,209,645 00 | 3,011,689 00 | 2,775,132 00 |
| Unapportioned | 9,487,888 00 | 11,028,877 00 | 7,821,357 00 |
| Totals | $88,419,079 00§ | $87,497,879 00 | $88,972,385 00 |

*Included in Stanislaus. §Including asphalt. [1]Included in Colusa.

The figures opposite "unapportioned" are necessary because of th fact that some branches of the mineral industry are so centralized that if the value of their output were listed under the county fro which they come private business would be made public. For thi reason there are several instances where the real value of the count mineral yield is much greater than is shown in the above summary

CHAPTER TWO.

# FUELS.

**Coal.**

*Reference:* State Mineralogist Report VII, XII, XIII.

Twenty-five, out of the fifty-eight, counties of California contain coal deposits, many of them undeveloped, and almost all of an interior quality. Coal was first commercially produced in the State in 1861 and for many years previous to the introduction of petroleum as a fuel was an important factor in the mineral industry of the State. At the present time the output is small and the price received relatively low, and fluctuating. During 1912 the total coal production amounted to 14,848 tons valued at $39,092, an average of $2.63 per ton, as compared with 11,047 tons produced in 1911 having a spot value of $18,297, or $1.65 per ton. This is an increase of 3,801 tons in amount, and $20,795 in value, the excessive increase in price being due to the production of a better grade of coal than was mined during the preceding year, as well as to a noticeable strengthening in the local demand.

**Natural Gas.**

*Reference:* State Mineralogist Report VII, X, XII. Bulletins 3 and 13.

Natural gas valued at $940,076 was used as a fuel, for lighting, and for other purposes, including the manufacture of gasoline, during 1912, in California. This shows a great increase over the value of the 1911 product which was $491,859.

Active steps have been recently taken toward the conservation of natural gas in the State, untold quantities of which have been lost and wasted in the past.

It is impossible to arrive at even approximate figures for amount of gas used as in many cases the operators make no attempt to measure it; the value as well, in numerous instances, represents merely an approximation, especially in the case of oil operators who utilize a portion of the gas which is encountered as fuel under their boilers and figure its value in terms of what it would cost to obtain the required power in some other way.

Production for 1912 by counties, is given in the following tabulated form:

| County | Value |
|---|---|
| Fresno | $21,380 00 |
| Humboldt | 150 00 |
| Kern | 325,484 00 |
| Kings | 1,650 00 |
| Los Angeles | 78,672 00 |
| Orange | 5,250 00 |
| Sacramento | 96,000 00 |
| San Joaquin | 145,166 00 |
| Santa Barbara | 253,633 00 |
| Solano | 8,528 00 |
| Ventura | 4,163 00 |
| Total | $940,076 00 |

**Petroleum.**

*Reference:* Bulletins 3, 11, 16, 19, 31, 32, 63. State Mineralogist Report IV, X, XII, XIII.

Petroleum production in California during 1912 amounted to a total of 89,689,250 barrels, valued at $41,868,344, or an average of $0.467 per barrel as compared with 84,648,157 barrels produced in 1911 worth $40,552,088 with an average price of $0.479 per barrel. This is an increase in amount of 5,041,093 barrels and in value of $1,316,256, but a decrease in the price received per barrel of $0.012.

Of the total number of barrels produced in 1912, 6,050,186 were used as fuel in the field. This item, which has always been a comparatively large one, is gradually diminishing on account of the growing use of electricity and gas in the oil fields for power purposes.

Considerable successful development work was done during the year in the lighter oil sections of the State, and in the face of a decrease in the average price per barrel for the State, Orange, Santa Barbara and Ventura counties reported an increase in price, as well as production. The only section which suffered a decreased production was Los Angeles County—this is due partly to the fact that the city field is rapidly becoming more valuable as real estate than it is as oil territory, and more especially because we have some of the oldest producing wells in the State, and many of them are rapidly approaching the end of their days as profitable producers.

The following table gives in detail the production and value of petroleum produced in California in 1912, and the corresponding figures for 1911, by county, as well as the average prices received, with increase, or decrease, in each instance:

**Fresno County.**

| | Amount, barrels | Value | Average | Used as fuel in field |
|---|---|---|---|---|
| 1911 | 19,499,611 | $9,344,085 | .479 | 1,250,000 |
| 1912 | 19,510,932 | 8,487,255 | .435 | 1,250,566 |
| | 11,321 increase | $856,830 decrease | .044 decrease | |

**Kern County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 46,562,825 | $20,207,906 | .432 | 2,993,600 |
| 1912 | 51,448,067 | 21,762,532 | .423 | 3,549,916 |
| | 4,885,242 increase | $1,554,626 increase | .009 decrease | |

**Los Angeles County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 4,924,288 | $3,313,972 | .672 | 375,000 |
| 1912 | 4,484,590 | 2,798,384 | .624 | 358,240 |
| | 439,698 decrease | $515,588 decrease | .048 decrease | |

**Orange County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 6,345,275 | $4,097,980 | .645 | 418,000 |
| 1912 | 6,704,421 | 4,478,553 | .668 | 417,388 |
| | 359,146 increase | $380,573 increase | .023 increase | |

**San Luis Obispo County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 38,092 | $25,146 | ------ | ---------- |
| 1912 | 2,129 | 1,469 | ------ | ---------- |
| | 35,963 decrease | $23,677 decrease | ------ | |

**Santa Barbara County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 6,766,156 | $3,204,717 | .488 | 431,000 |
| 1912 | 6,862,719 | 3,747,045 | .564 | 432,787 |
| | 96,563 increase | $542,328 increase | .058 increase | |

**Santa Clara County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 12,828 | $8,505 | ------ | ---------- |
| 1912 | 14,092 | 8,295 | ------ | ---------- |
| | 1,264 increase | $210 decrease | ------ | |

**Ventura County.**

| | | | | |
|---|---|---|---|---|
| 1911 | 499,082 | $349,777 | .700 | 32,400 |
| 1912 | 662,300 | 584,811 | .883 | 41,289 |
| | 163,218 increase | $235,034 increase | .183 increase | |

**State Totals.**

| | | | | |
|---|---|---|---|---|
| 1911 | 84,648,157 | $40,552,088 | .479 | 5,500,000 |
| 1912 | 89,689,250 | 41,868,344 | .467 | 6,050,186 |
| | 5,041,093 increase | $1,316,256 increase | .012 decrease | |

The annual petroleum production, in barrels, since the inception of the industry in California follows, with the amount credited to the year 1875 representing total production up to, and including, that date.

| Year | Barrel | Year | Barrel |
|---|---|---|---|
| 1875 | 175,000 | 1895 | 1,245,33 |
| 1876 | 12,000 | 1896 | 1,257,78 |
| 1877 | 13,000 | 1897 | 1,911,56 |
| 1878 | 15,227 | 1898 | 2,249,08 |
| 1879 | 19,858 | 1899 | 2,677,87 |
| 1880 | 40,552 | 1900 | 4,329,95 |
| 1881 | 99,862 | 1901 | 7,710,31 |
| 1882 | 128,636 | 1902 | 14,356,91 |
| 1883 | 142,857 | 1903 | 24,340,83 |
| 1884 | 262,000 | 1904 | 29,736,00 |
| 1885 | 325,000 | 1905 | 34,275,70 |
| 1886 | 377,145 | 1906 | 32,624,00 |
| 1887 | 678,572 | 1907 | 40,311,17 |
| 1888 | 690,333 | 1908 | 48,306,91 |
| 1889 | 303,220 | 1909 | 58,191,72 |
| 1890 | 307,360 | 1910 | 77,697,56 |
| 1891 | 323,600 | 1911 | 84,648,15 |
| 1892 | 385,049 | 1912 | 89,689,25 |
| 1893 | 470,179 | | |
| 1894 | 783,078 | Total (barrels) | 561,112,67 |

The value of the crude oil output during the early years of its production is a difficult quantity to arrive at accurately. Taking the total value given in Bulletin No. 60, which includes the years 1887–1909, as a basis, the grand total value of the petroleum produced in California during the past twenty-five years, is as follows:

| Year | Value |
|---|---|
| 1887-1909 | $136,693,22 |
| 1910 | 37,689,54 |
| 1911 | 40,552,08 |
| 1912 | 41,868,34 |
| Total | $256,803,20 |

CHAPTER THREE.

# METALS.

Antimony.

*Reference:* Bulletin 38. State Mineralogist Report XII, XIII.

Deposits of antimony ore are located in Inyo, Kern, Merced, Riverside and San Benito counties. There has been no commercial production of the metal in California since 1901, principally because of the fact that prices have been too low to make the mining of the ore profitable.

Copper.

*Reference:* Bulletins 23 and 50. State Mineralogist Report XII, XIII.

For the calender year 1912 the California production of copper amounted to 34,169,997 pounds, valued at $5,638,049 as compared with 36,838,024 pounds produced in 1911 worth $4,604,753. The increased value, in spite of the decrease in production, was made possible on account of the advance in price from 12½ cents per pound in 1911, to 16½ cents per pound in 1912.

Copper is widely distributed throughout the State in the following general districts: The Shasta County copper belt; the Coast Range deposits, running from Del Norte more or less continuously to San Luis Obispo County; the Sierra Nevada belt, starting in Plumas County and continuing in a general southerly direction through the Mother Lode counties and ending in Kern; the Eastern belt, in Mono and Inyo counties; and the Southern belt, which is located in San Bernardino, Riverside and San Diego counties. By far the most important belt is the one located in Shasta County.

Copper production has been far below normal in the State during the past few years on account of the enforced closing of some of the largest smelters owing to the alleged damage done to the surrounding agricultural products by the smelter smoke. A great deal of money has been spent in an effort to do away with the obnoxious fumes with considerable success, and the present outlook is for a greatly increased production in the near future.

Twelve counties reported copper production for 1912 as is shown in the following table:

| County | Amount | Value |
|---|---|---|
| Amador | 175,608 lbs. | $28,975 00 |
| Calaveras | 6,125,415 lbs. | 1,010,693 00 |
| Inyo | 48,584 lbs. | 8,016 00 |
| Madera | 248,129 lbs. | 40,941 00 |
| Mariposa | 284,587 lbs. | 46,957 00 |
| Mono | 8,179 lbs. | 1,350 00 |
| Placer | 78,170 lbs. | 12,898 00 |
| Plumas | 6,963 lbs. | 1,149 00 |
| Riverside | 6,000 lbs. | 990 00 |
| San Bernardino | 1,937,185 lbs. | 319,636 00 |
| Shasta | 25,249,892 lbs. | 4,166,232 00 |
| Sierra | 1,285 lbs. | 212 00 |
| Totals | 34,169,997 lbs. | $5,638,049 00 |

**Gold.**

*Reference:* All State Mineralogist Reports. Bulletins 36, 57 and 45.

The California State Mining Bureau has never independently collected statistics of gold and silver production. Gold, silver and platinum figures in this Bulletin are obtained from the United States Geological Survey.

The following table shows gold production in California, by county, for the year 1912:

| County | Value | County | Value |
|---|---|---|---|
| Alpine | [1] | Nevada | $2,081,958 00 |
| Amador | $2,796,194 00 | Placer | 367,383 00 |
| Butte | 2,346,229 00 | Plumas | 193,237 00 |
| Calaveras | 962,145 00 | Riverside | 20,202 00 |
| Del Norte | 3,940 00 | Sacramento | 1,712,587 00 |
| El Dorado | 105,565 00 | San Bernardino | 293,900 00 |
| Fresno | 6,094 00 | San Luis Obispo | [5] |
| Humboldt | 31,271 00 | Shasta | 986,803 00 |
| Inyo | 369,758 00 | Sierra | 732,988 00 |
| Kern | 830,420 00 | Siskiyou | 472,314 00 |
| Los Angeles | [2] | Stanislaus[6] | 227,527 00 |
| Madera | 9,162 00 | Trinity | 723,503 00 |
| Mariposa | 160,541 00 | Tuolumne | 1,113,291 00 |
| Merced | [3] | Yuba | 2,753,408 00 |
| Modoc | 27,893 00 | | |
| Mono | 377,518 00 | Total | $19,713,478 00 |
| Monterey[4] | 7,647 00 | | |

[1]Product included in Stanislaus. [2]Product included in Monterey. [3]Product included in Stanislaus. [4]Including Los Angeles and San Luis Obispo. [5]Product included in Monterey. [6]Including Alpine and Merced.

**Total Gold Production of California.**

The following table was compiled by Chas. G. Yale, of the Division of Mineral Resources, U. S. Geological Survey, but for a number of years Statistician of the California State Mining Bureau and the U. S.

Mint at San Francisco. The authorities chosen for certain periods were: J. D. Whitney, State Geologist of California; John Arthur Phillips, author of "Mining and Metallurgy of Gold and Silver" (1867); U. S. Mining Commissioner R. W. Raymond; U. S. Mining Commissioner J. Ross Browne; Wm. P. Blake, Commissioner from California to the Paris Exposition, where he made a report on "Precious Metals" (1867); John J. Valentine, author for many years of the annual report on precious metals published by Wells Fargo & Company's Express; and Louis A. Garnett, in the early days manager of the San Francisco refinery where records of gold receipts and shipments were kept. Mr. Yale obtained other data from the reports of the Director of the U. S. Mint and the director of the U. S. Geological Survey. The authorities referred to, who were alive at the time of the original compilation of this table in 1894, were all consulted in person or by letter by Mr. Yale with reference to the correctness of their published data, and the final table quoted was then made up. The figures of the last seven years are those prepared by the U. S. Geological Survey:

| Year | Value | Year | Value |
|---|---|---|---|
| 1848 | $245,301 00 | 1882 | $17,146,416 00 |
| 1849 | 10,151,360 00 | 1883 | 24,316,873 00 |
| 1850 | 41,273,106 00 | 1884 | 13,600,000 00 |
| 1851 | 75,938,232 00 | 1885 | 12.661.044 00 |
| 1852 | 81,294,700 00 | 1886 | 14.716.506 00 |
| 1853 | 67,613,487 00 | 1887 | 13.588.614 00 |
| 1854 | 69,433,931 00 | 1888 | 12.750.000 00 |
| 1855 | 55,485,395 00 | 1889 | 11,212.913 00 |
| 1856 | 57,509,411 00 | 1890 | 12,309.793 00 |
| 1857 | 43,628,172 00 | 1891 | 12,728.869 00 |
| 1858 | 46,591,140 00 | 1892 | 12,571,900 00 |
| 1859 | 45,846,599 00 | 1893 | 12,422,811 00 |
| 1860 | 44,095,163 00 | 1894 | 13,923,281 00 |
| 1861 | 41,884,995 00 | 1895 | 15.334,317 00 |
| 1862 | 38,854,668 00 | 1896 | 17.181,562 00 |
| 1863 | 23,501,736 00 | 1897 | 15.871,401 00 |
| 1864 | 24,071,423 00 | 1898 | 15,906,478 00 |
| 1865 | 17,930,858 00 | 1899 | 15.336.031 00 |
| 1866 | 17,123,867 00 | 1900 | 15.863,355 00 |
| 1867 | 18,265.452 00 | 1901 | 16.989,044 00 |
| 1868 | 17,555.867 00 | 1902 | 16,910,320 00 |
| 1869 | 18,229,044 00 | 1903 | 16,471,264 00 |
| 1870 | 17,458,133 00 | 1904 | 19,109,600 00 |
| 1871 | 17,477,885 00 | 1905 | 19,197,043 00 |
| 1872 | 15,482,194 00 | 1906 | 18,732,452 00 |
| 1873 | 15,019,210 00 | 1907 | 16.727,928 00 |
| 1874 | 17.264.836 00 | 1908 | 18,761,559 00 |
| 1875 | 16,876,009 00 | 1909 | 20,237,870 00 |
| 1876 | 15,610,723 00 | 1910 | 19,715,440 00 |
| 1877 | 16,501,268 00 | 1911 | 19,738,908 00 |
| 1878 | 18,839,141 00 | 1912 | 19,713,478 00 |
| 1879 | 19,626,654 00 | | |
| 1880 | 20,030,761 00 | Total | $1,567,680,946 00 |
| 1881 | 19,223,155 00 | | |

It will be observed that the largest production for any one year was in 1852, when it reached $81,294,700. This was at the time of the most active development of the superficial placers, when thousands of men were at work with pan, rocker, long-tom and sluice, and even the hydraulic method had been introduced in a small way.

**Iron.**

*Reference:* State Mineralogist Reports II, IV, V, X, XII, XIII. Bulletin 38.

Production of iron ore in California during 1912 amounted to 2,508 tons, having a spot value of $1 per ton. This is a very notable increase over the 1911 production of 558 tons. There was a small output of this mineral in 1893 and nominal amounts have been produced intermittently since that time, the entire production previous to 1912 amounting to 2,095 tons, or 413 tons less than for the year just past. Vast deposits of iron ore, distributed through thirty-one counties of the State, are already known. With improvements in the metallurgy of iron and steel, the changes to be wrought in commercial conditions by the opening of the Panama Canal, and the gradual depletion of the iron ranges of the East, this branch of the mineral industry in California should soon become one to rank with petroleum and gold in the value of its output.

**Lead.**

*Reference:* State Mineralogist Reports IV, VIII, X.

Thirteen counties in California reported a production of lead for 1912. In four instances, namely, Butte, Calaveras, El Dorado and Placer counties, the output was negligible being recovered from concentrates shipped to the smelter and having values of but a few dollars. The total lead production for the State amounted to 1,370,067 pounds, valued at $61,653, as compared with an output of 1,403,839 pounds worth $63,173 in 1911. The average price of lead during 1912 was 4½ cents per pound.

Tabulated county returns are as follows:

| County | Amount | Value |
|---|---|---|
| Inyo | 1,207,593 lbs. | $54,342 00 |
| Kern | 19,664 lbs. | 885 00 |
| Madera | 5,533 lbs. | 249 00 |
| Mono | 23,936 lbs. | 1,077 00 |
| Nevada | 1,785 lbs. | 80 00 |
| Plumas | 5,856 lbs. | 264 00 |
| Riverside | 929 lbs. | 42 00 |
| San Bernardino | 94,852 lbs. | 4,268 00 |
| Sierra | 9,919 lbs. | 446 00 |
| Totals | 1,370,067 lbs. | $61,653 00 |

**Molybdenum.**

Deposits of molybdenite have been observed in different localities in California in the past but no molybdenum has been commercially produced, to date. It is used to a small extent in steel making and has recently been successfully used as an improvement over tungsten in electric light globes. Some development work has been done on molybdenum deposits in Kern County during the past year.

**Platinum.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 38.

Platinum production in California during the year 1912 amounted to 603 ounces, worth $19,731, as compared to 511 Troy ounces, valued at $14,873, in 1911. Platinum yield in the State is largely due to its incidental recovery along with placer gold in various dredging and hydraulic fields.

**Quicksilver.**

*Reference:* State Mineralogist Reports IV, X, XII, XIII. Bulletin 27.

Quicksilver production in California during 1912 amounted to 20,600 flasks having a total value of $866,024, an average of $42.04 per flask, as compared with the 1911 output of 19,109 flasks valued at $879,205. The average price per flask, of 75 pounds, suffered a decrease of $3.97 in 1912, as compared with the previous year, thus causing a decrease of 1.5 per cent in the total value of the metal produced while the amount increased 7.8 per cent.

Eight counties reported a production of quicksilver during 1912 against nine for 1911. Colusa and Santa Barbara counties had a small output in 1911 which was not duplicated last year, and during 1912 Fresno County operators shipped a quantity of the metal for the first time. The eight producing counties, in the order of their importance in this branch of the mineral industry, are as follows: San Benito, Santa Clara, San Luis Obispo, Sonoma, Fresno, Napa, Lake and Trinity. In addition to the above, owners of quicksilver properties from the following twelve counties answered inquiries sent out by the State Mining Bureau: Colusa, El Dorado, Kings, Monterey, Modoc, Santa Barbara, Shasta, Siskiyou, Solano, Stanislaus and Yolo. In round numbers 80 per cent of the quicksilver production of the United States comes from California.

The following table shows the California production by counties, in 1912, with the increase or decrease in amount as compared with 1911:

| County | Flasks | Value | Increase | Decrease |
|---|---|---|---|---|
| Colusa | | | | 5 flasks |
| Fresno | 336 | $14,125 | 336 flasks | |
| Lake | 209 | 8,786 | | 690 flasks |
| Napa | 287 | 12,065 | 147 flasks | |
| San Benito | 9,743 | 409,596 | | 32 flasks |
| San Luis Obispo | 666 | 27,998 | 97 flasks | |
| Santa Barbara | | | | 50 flasks |
| Santa Clara | 8,695 | 365,538 | 1,162 flasks | |
| Sonoma | 646 | 27,158 | 552 flasks | |
| Trinity | 18 | 758 | | 26 flasks |
| Totals | 20,600 | $866,024 | 1,491 flasks | |

**Silver.**

*Reference:* State Mineralogist Reports IV, VIII, XII.

Silver production in California during 1912 amounted to $799,584 as compared with the output of $673,336 in 1911, according to the data collected by the United States Geological Survey, from which source these figures, along with those of gold and platinum, are derived. The average price for silver for 1912 was 61½ cents, or 8½ cents per ounce higher than for 1911.

Tabulated county returns are as follows:

| County | Value | County | Value |
|---|---|---|---|
| Alpine | [1] | Nevada | $22,830 00 |
| Amador | $32,037 00 | Placer | 4,791 00 |
| Butte | 5,567 00 | Plumas | 957 00 |
| Calaveras | 70,748 00 | Riverside | 254 00 |
| Del Norte | 10 00 | Sacramento | 3,544 00 |
| El Dorado | 843 00 | San Bernardino | 49,962 00 |
| Fresno | 23 00 | San Luis Obispo | [5] |
| Humboldt | 150 00 | Shasta | 425,382 00 |
| Inyo | 45,316 00 | Sierra | 2,777 00 |
| Kern | 11,480 00 | Siskiyou | 2,980 00 |
| Los Angeles | [2] | Stanislaus[6] | 1,974 00 |
| Madera | 1,162 00 | Trinity | 7,494 00 |
| Mariposa | 6,796 00 | Tuolumne | 25,146 00 |
| Merced | [3] | Yuba | 6,198 00 |
| Modoc | 494 00 | | |
| Mono | 70,602 00 | Total | $799,584 00 |
| Monterey[4] | 67 00 | | |

[1]Product included in Stanislaus. [2]Product included in Monterey. [3]Product included in Stanislaus. [4]Including Los Angeles and San Luis Obispo. [5]Product included in Monterey. [6]Including Alpine and Merced.

**Tungsten.**

*Reference:* Bulletin 38.

Tungsten ore to the amount of 8,042 tons containing tungsten valued at $206,000 was mined in California during 1912. The value of the tungsten output for 1911 was $127,706.

This metal is used largely in the steel industry and also as a filament in electric incandescent lamps.

Tungsten ores are sold per unit of tungstic trioxide, marketable ores carrying at least 45 per cent of $WO_3$.

**Tin.**

While there are several deposits of tin ore in the United States the production for the entire country is practically nothing. A small deposit of cassiterite near Corona, in Riverside County, was worked in the early nineties and tin to the value of $59,964 was produced. The deposit is very small and irregular and no development work has been done on it for many years. Traces of tin ore have also been discovered in Orange County.

**Vanadium.**

There is a growing demand for vanadium for use particularly in the steel industry. California has never produced this metal commercially, but deposits of vanadium ores are at present being exploited in two or three localities.

**Zinc.**

*Reference:* Bulletin 38.

During 1912 zinc to the amount of 4,331,391 pounds, with a total value of $298,866 was produced in California, as compared with 2,679,842 pounds worth $152,751 in 1911. The average price per pound received for zinc during 1912 was $.069. A small quantity of this metal was mined in the State in 1906–8 and with this exception 1911 was the first year to show returns from this branch of the mineral industry. As will be noted the output was practically doubled in 1912 as compared with the previous year. Zinc ores are found in Inyo, Orange, San Bernardino and Shasta counties; zinc is also an ingredient of many copper and other ores in various portions of the State.

CHAPTER FOUR.

# STRUCTURAL MATERIALS.

### Asphalt.

*Reference:* State Mineralogist Reports VII, X, XII, XIII. Bulletins 16 and 32.

Deposits of natural asphalt have been found in Kern, Los Angeles, Monterey, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz and Ventura counties. In recent years refined asphalt, only, has been used commercially because a better grade can be produced for less money than the deposits of natural asphalt afford. In round numbers the refined product sold in 1912 amounted to 250,000 tons valued at $2,500,000, or $10 per ton. This is an increase of 70,000 tons over the corresponding production during 1911, although the price per ton decreased about $2. Over forty oil refineries are in operation in California situated in the following counties: Alameda, Contra Costa, Fresno, Kern, Los Angeles, San Diego, Santa Barbara, San Luis Obispo, San Francisco and Ventura.

Asphalt is used principally in street paving; also for roofing, insulating, preservative of piling, etc.

Production figures for asphalt are not added to the total of the State's mineral output because it is included in the value of the crude petroleum from which it is manufactured and the addition of the value of this by-product would give an erroneous result, too high by the above amount, *i. e.*, $2,500,000 for the year 1912.

### Bituminous Rock.

*Reference:* State Mineralogist Reports XII, XIII.

Production of bituminous rock in California amounted to 44,073 tons valued at $87,467 for the year 1912, output being reported from San Luis Obispo, Santa Barbara and Santa Cruz counties. This is a considerable decrease from the 1911 figures when 75,125 tons were produced worth $117,279.

Solano County, which was the largest producer in 1911 reported no output of bituminous rock during 1912, the product which had deteriorated somewhat in quality being used merely as crushed rock, and classified as such.

Santa Barbara County is a new producer of this material.

Distribution by county, for 1912, is as follows:

| County | Amount | Value |
|---|---|---|
| San Luis Obispo | 807 tons | $1,472 00 |
| Santa Barbara | 11,120 tons | 5,556 00 |
| Santa Cruz | 32,146 tons | 80,439 00 |
| Totals | 44,073 tons | $87,467 00 |

**Brick.**

*Reference:* Bulletin 38.

The total brick production in California during the year 1912 amounted to 337,233 M, valued at $2,940,290, as compared with an output of 327,474 M worth $2,638,121 in 1911, or an increase in amount of 9,759 M, and in value of $302,169.

Twenty-five counties contributed to the above total and a great variety of brick was produced, including common, fire, pressed, glazed, sand lime, and others. An attempt has been made to segregate the figures for the different kinds of brick, as will be noted in the following county tabulation. In many cases reports from operators of brick kilns make no classification. Such figures are necessarily listed as "miscellaneous." Therefore it will be understood that the totals under the different headings are low in each classification.

According to Bulletin No. 38, issued by the California State Mining Bureau, the following analyses show the average and the maximum and minimum of the ingredients commonly occurring in brick clays. A clay in which the percentage of any one or more of the ingredients mentioned is much above the maximum given or below the minimum will prove an inferior, if not worthless, clay for even common brick.

**Chemical Analyses of Common-Brick Clays.**

| | Average | Minimum | Maximum |
|---|---|---|---|
| Silica ($SiO_2$), combined | 15.0% | 12.0% | 30.0% |
| Silica sand | 55.0% | 20.0% | 60.0% |
| Alumina ($Al_2O_3$) | 14.0% | 11.0% | 25.0% |
| Water ($H_2O$), combined | 4.0% | 3.0% | 9.0% |
| Water moisture | 2.0% | 0.0% | 6.0% |
| Iron oxide ($Fe_2O_3$) | 4.0% | 2.5% | 8.0% |
| Lime (CaO) | 1.5% | 0.5% | 7.0% |
| Magnesia (MgO) | 1.5% | 0.3% | 7.0% |
| Alkalies ($K_2O$, $Na_2O$) | 3.5% | 2.0% | 7.0% |

The detailed figures of brick production for 1912, by counties, are as follows:

## Brick Production for 1912, by Counties.

| County | Common | | Pressed, fire, glazed, etc. | | Sand lime | | Miscellaneous | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Amount, M | Value | Amount, M | Value | Amount, M | Value | Amount, M | Value | Amount, M | Value |
| Alameda | 9,300 | $46,500 | 3,500 | $86,600 | | | | | 12,800 | $133,100 |
| Amador | | | 2,500 | 25,000 | | | | | 2,500 | 25,000 |
| Contra Costa | 19,942 | 122,538 | | | 500 | $3,500 | 12,179 | $157,680 | 32,621 | 283,718 |
| Fresno | 5,000 | 40,000 | | | | | | | 5,000 | 40,000 |
| Humboldt | 772 | 6,415 | | | | | | | 772 | 6,415 |
| Imperial | 3,250 | 20,000 | | | | | | | 3,250 | 20,000 |
| Kern | | | | | | | 1,890 | 23,120 | 1,890 | 23,120 |
| Los Angeles | 79,234 | 507,836 | 20,300 | 710,164 | 496 | 3,320 | 74,832 | 470,938 | 174,862 | 1,692,258 |
| Madera | 300 | 1,500 | | | | | | | 300 | 1,500 |
| Marin | | | | | | | 18,000 | 88,200 | 18,000 | 88,200 |
| Orange | | | | | | | 1,300 | 9,100 | 1,300 | 9,100 |
| Placer | | | | | | | 900 | 21,250 | 900 | 21,250 |
| Riverside | 2,500 | 20,000 | | | | | | | 2,500 | 20,000 |
| Sacramento | | | | | | | 26,073 | 161,535 | 26,073 | 161,535 |
| San Diego | | | | | | | 10,500 | 80,000 | 10,500 | 80,000 |
| San Joaquin | | | | | | | 6,128 | 64,874 | 6,128 | 64,874 |
| San Mateo | | | 1,400 | 40,500 | | | | | 1,400 | 40,500 |
| Santa Barbara | 2,615 | 17,150 | | | | | | | 2,615 | 17,150 |
| Santa Clara | 18,000 | 105,000 | | | | | | | 18,000 | 105,000 |
| Shasta | 1,697 | 10,195 | | | | | | | 1,697 | 10,195 |
| Solano | | | | | | | 2,200 | 20,000 | 2,200 | 20,000 |
| Stanislaus | 250 | 2,000 | | | | | | | 250 | 2,000 |
| Tehama | 225 | 1,300 | | | | | | | 225 | 1,300 |
| Tulare | 10,900 | 70,500 | | | | | | | 10,900 | 70,500 |
| Ventura | 550 | 3,575 | | | | | | | 550 | 3,575 |
| Totals | 154,535 | $974,509 | 27,700 | $862,264 | 996 | $6,820 | 154,002 | $1,096,697 | 337,233 | $2,940,290 |

**Cement.**

*Reference:* State Mineralogist Reports VIII, IX, XII. Bulletin 38.

During 1912 California's output of cement was 6,198,634 barrels valued at $6,074,661, as compared with 6,371,369 barrels produced in 1911 having a value of $9,085,625. The cement industry is so centralized that it is impossible to apportion the production to the counties in which the plants are located without making private business public.

Cement was first commercially produced in the State in 1891. While the total figures are not of the same magnitude as those for gold and petroleum the growth of the industry has been more than rapid, and a comparison of the annual figures representing the output since the inception of the industry is of interest.

Annual production of cement in California is as follows:

| Year | Amount | Value |
|---|---|---|
| 1891 | 5,000 bbls. | $15,000 00 |
| 1892 | 5,000 bbls. | 15,000 00 |
| 1893 | | |
| 1894 | 8,000 bbls. | 21,600 00 |
| 1895 | 16,383 bbls. | 32,556 00 |
| 1896 | 9,500 bbls. | 28,250 00 |
| 1897 | 18,000 bbls. | 66,000 00 |
| 1898 | 50,000 bbls. | 150,000 00 |
| 1899 | 60,000 bbls. | 180,000 00 |
| 1900 | 52,000 bbls. | 121,000 00 |
| 1901 | 71,800 bbls. | 159,842 00 |
| 1902 | 171,000 bbls. | 423,600 00 |
| 1903 | 640,868 bbls. | 968,727 00 |
| 1904 | 969,538 bbls. | 1,539,807 00 |
| 1905 | 1,265,553 bbls. | 1,791,916 00 |
| 1906 | 1,286,000 bbls. | 1,941,250 00 |
| 1907 | 1,613,563 bbls. | 2,585,577 00 |
| 1908 | 1,629,615 bbls. | 2,359,692 00 |
| 1909 | 3,779,205 bbls. | 4,969,437 00 |
| 1910 | 5,453,193 bbls. | 7,485,715 00 |
| 1911 | 6,371,369 bbls. | 9,085,625 00 |
| 1912 | 6,198,634 bbls. | 6,074,661 00 |
| Totals | 29,674,221 bbls. | $40,015,255 00 |

**Chrome.**

*Reference:* State Mineralogist Reports IV, XII. Bulletin 38.

In 1912 chrome production to the amount of 1,270 tons, having a spot value of $11,260, was reported from Shasta, Siskiyou and Fresno counties. The 1911 output was 935 tons valued at $14,197, showing a gain in amount for 1912 of 335 tons, and a loss in value of $2,937. The decrease in price was due to the production of an inferior grade of ore as compared with that of the previous year. Chrome, or more correctly, chromic iron ore, is used principally as the refractory ingredient in reverberatory and other furnace linings. The quantity of this ore in California, which is the sole source of domestic supply, far exceeds the demand, large deposits being known in Sonoma, Tehama, Tuolumne and other counties, in addition to those mentioned above.

During 1912 the reported production of chrome in California was as follows:

| County | Amount | Value |
|---|---|---|
| Fresno | 50 tons | $950 00 |
| Shasta | 1,000 tons | 8,000 00 |
| Siskiyou | 220 tons | 2,310 00 |
| Totals | 1,270 tons | $11,260 00 |

**Lime.**

*Reference:* Bulletin 38.

Lime production in the State during the year 1912 amounted to 522,118 barrels having a spot value of $464,440, as compared with the output in 1911 of 429,587 barrels valued at $390,988. Reports of production were received by the State Mining Bureau from several lime kilns which had been idle for the previous year, or for a longer period in some cases, showing an increased activity in the local consumption.

Lime production in 1912, by counties, is given in the following tabulated form:

| County | Amount | Value |
|---|---|---|
| Amador | 800 bbls. | $1,040 00 |
| Contra Costa | 14,870 bbls. | 12,640 00 |
| El Dorado | 14,023 bbls. | 11,218 00 |
| Kern | 162,831 bbls. | 124,894 00 |
| Mono | 4,961 bbls. | 3,721 00 |
| Santa Barbara | 17,500 bbls. | 16,434 00 |
| Santa Clara | 13,508 bbls. | 10,154 00 |
| Santa Cruz | 169,646 bbls. | 159,505 00 |
| Shasta | 6,529 bbls. | 3,584 00 |
| Tuolumne | 117,450 bbls. | 121,250 00 |
| Totals | 522,118 bbls. | $464,440 00 |

**Magnesite.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 38.

There is no crude magnesite handled on the market. It is all calcined and ground before using. However, in the statistical reports, figures for crude ore at the property are used in all cases. To arrive at this it has been found that calcined magnesite has an average value of $25 per ton. Two and one half to two and one fourth tons of the crude ore make one ton of the calcined product; therefore, the arbitrary value of $10 per ton is used.

During the year 1912 the output of crude magnesite in California amounted to 10,512 tons having a value, according to the above assumption, of $105,120.

Besides the counties noted below, which reported a production of this material, deposits are located in Alameda, Mendocino, Napa, San Benito, Stanislaus, and others.

Production for 1912 by counties is as follows:

| County | Amount | Value |
|---|---|---|
| Fresno | 2,000 tons | $20,000 00 |
| Placer | 50 tons | 500 00 |
| Riverside | 878 tons | 8,780 00 |
| Santa Clara | 600 tons | 6,000 00 |
| Sonoma | 300 tons | 3,000 00 |
| Tulare | 6,684 tons | 66,840 00 |
| Totals | 10,512 tons | $105,120 00 |

**Marble.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

Marble production was reported from but two counties during the year 1912 although large deposits of good quality stone exist extensively throughout the State, and California marble should, in time, take the place of the large amount of eastern and foreign stone which is annually imported for building and ornamental purposes.

The 1912 output amounted to 27,820 cubic feet having a spot value of $74,120, as compared with 20,201 cubic feet worth $54,103 produced in 1911.

Production by counties follows:

| County | Amount | Value |
|---|---|---|
| Tulare | 100 cu. ft. | $200 00 |
| Tuolumne | 27,720 cu. ft. | 73,920 00 |
| Totals | 27,820 cu. ft. | $74,120 00 |

**Onyx and Travertine.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

Onyx and travertine marble were produced in California to the value of $91,400 between the years 1887 and 1896. During the past sixteen years there has been no production of this kind of building stone in the State, although many partially exploited deposits exist in a score of counties. Practically all the onyx and travertine now used on the coast is imported from Mexico.

**Sandstone.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

Sandstone deposits, developed to a greater or less extent, are to be found in twenty-two counties of the State. But five of these counties reported a production during 1912 and the total output of 66,487 cubic feet with a spot value of $22,574 is a large decrease from the annual amount marketed in previous years. The quality of the California sandstone is undoubtedly good and in most cases is dark in color. The decreased production is directly attributable to two facts: (1) the

growing tendency toward a white or light colored stone in public buildings, and (2), the increased use of concrete in buildings of all kinds.

County production of sandstone for 1912 is shown in the following table:

| County | Amount | Value |
|---|---|---|
| Amador | 6,000 cu. ft. | $3,000 00 |
| Colusa | 51,137 cu. ft. | 15,804 00 |
| Santa Barbara | 4,500 cu. ft. | 1,670 00 |
| Siskiyou | 250 cu. ft. | 250 00 |
| Ventura | 4,600 cu. ft. | 1,850 00 |
| Totals | 66,487 cu. ft. | $22,574 00 |

**Serpentine.**

*Reference:* Bulletin 38.

Serpentine has been quarried both as a building and as an ornamental stone in various parts of California during the past twenty years. In most cases, however, it lacks sufficient brightness of color to be desirable for ornamental purposes, and has too many cracks and impurities to make a first-class building stone. The value of all the serpentine produced in the State amounts to only $33,259. Production was last reported in 1907.

**Slate.**

*Reference:* Bulletin 38.

Slate production in California had its beginning in 1889 and has been continuous, in greater or less amount, up to 1911, since when no production has been reported. The output has been rapidly declining in recent years. Many large deposits of slate are known in the State, but its greatest use in the past has been as a fireproof roofing, and the various brands of "ready roofing" which have been placed on the market in recent years have hurt the industry seriously.

**Stone Industry.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

This classification has been arbitrarily made to include the following closely allied branches of the mineral industry: Granite, paving blocks, macadam, concrete, rubble and crushed rock of all kinds, sand and gravel.

In previous reports these materials have been handled separately, but it has been found that from the standpoint of the producer they overlap to such an extent that it is much more satisfactory to group them as has been done in this report.

In so far as it has been possible to do so, granite and crushed rock production has been subdivided into the various uses to which the product was put. It will be noted, however, that in both instances a very large percentage of the output has been tabulated under the heading "Unclassified." This is necessary because of the fact that many of the

producers have no way of telling to what specific use their rock was put after they have quarried and sold the same.

Thirty-seven counties reported a production of this class of material during 1912 against 34 counties in 1911. The value of the 1912 output shows a total of $5,473,928, or a 30 per cent increase over the 1911 production of $4,176,918. Not only did the total value make such a great advance, but every item shows a healthy increase, and with very few exceptions the county totals mark a corresponding progress.

Los Angeles County led all others in 1911 in this branch of the industry with a product valued at $536,876. For 1912 three counties exceeded this figure, Los Angeles again leading with a total of $955,668; San Bernardino second with an output valued at $580,824, and Riverside County third with a production of $567,309.

The total is made up of the following—all values being for the crude material at the property:

| | Value |
|---|---|
| Building stone (granite) | $108,025 00 |
| Monumental stone (granite) | 94,563 00 |
| Curbing | 76,477 00 |
| Granite (unclassified) | 83,910 00 |
| Paving blocks | 578,355 00 |
| Macadam | 848,235 00 |
| Rubble | 218,843 00 |
| Concrete | 578,267 00 |
| Crushed rock (unclassified) | 2,045,665 00 |
| Sand and gravel | 841,588 00 |
| Total | $5,473,928 00 |

The various sub-totals showing comparative values for 1911 and 1912, with the amount of increase attained during the latter year, is as follows:

| | Value |
|---|---|
| Total granite production 1911 | $355,742 00 |
| Total granite production 1912 | 362,975 00 |
| Increase for 1912 | $7,233 00 |
| Paving block production 1911 | $210,819 00 |
| Paving block production 1912 | 578,355 00 |
| Increase for 1912 | $367,536 00 |
| Crushed rock production 1911 | $3,610,357 00 |
| Crushed rock production 1912 | 4,532,598 00 |
| Increase for 1912 | $922,241 00 |
| Total stone industry, 1911 production | $4,176,918 00 |
| Total stone industry, 1912 production | 5,473,928 00 |
| Total increase for 1912 | $1,297,010 00 |

Granite Production, by Counties, for 1912.

| County | Building stone | | Monumental | | Curbing | | Unclassified | |
|---|---|---|---|---|---|---|---|---|
| | Cu. ft. | Value | Cu. ft. | Value | Cu. ft. | Value | Cu. ft. | Value |
| Fresno | | | 13,000 | $36,000 | | | | |
| Humboldt | 1,500 | $1,750 | 1,000 | 5,000 | 10,000 | $2,500 | 40,000 | $2,800 |
| Inyo | | | 640 | 648 | | | | |
| Madera | 11,800 | 9,440 | 21,500 | 17,200 | 8,835 | 4,418 | 40,000 | 25,000 |
| Nevada | | | 350 | 2,500 | 650 | 625 | | |
| Placer | 28,646 | 80,921 | 15,437 | 20,156 | 90,107 | 57,140 | 61,588 | 56,110 |
| Plumas | | | 1,000 | 1,350 | | | | |
| Riverside | 20,740 | 9,494 | 11,935 | 9,159 | 22,414 | 11,246 | | |
| San Bernardino | | | 320 | 350 | | | | |
| San Diego | | | 2,200 | 2,200 | | | | |
| Santa Barbara | 4,750 | 6,420 | | | 400 | 120 | | |
| Sonoma | | | | | 3,500 | 428 | | |
| Totals | 67,436 | $108,025 | 67,382 | $94,563 | 135,906 | $76,477 | 141,588 | $83,910 |

Paving block production, by counties, for 1912, is as follows:

| County | Amount | Value |
|---|---|---|
| Alameda | 12 M | $726 00 |
| Placer | 287 M | 9,010 00 |
| Riverside | 1,508 M | 88,142 00 |
| San Bernardino | 2,565 M | 161,150 00 |
| San Diego | 865 M | 54,650 00 |
| Sonoma | 5,781 M | 264,677 00 |
| Totals | 11,018 M | $578,355 00 |

Sand and gravel production, by counties, for 1912, is as follows:

| County | Amount | Value |
|---|---|---|
| Alameda | 299,043 tons | $106.410 00 |
| Butte | 106,181 tons | 11,853 00 |
| Colusa | 1,000 tons | 300 00 |
| Contra Costa | 171,530 tons | 86,812 00 |
| El Dorado | 300 tons | 75 00 |
| Fresno | 167,806 tons | 69,886 00 |
| Glenn | 543,675 tons | 32,950 00 |
| Humboldt | 20,300 tons | 15,400 00 |
| Imperial | 20,000 tons | 10,000 00 |
| Los Angeles | 395,979 tons | 124,817 00 |
| Marin | 1,200 tons | 600 00 |
| Mendocino | 500 tons | 300 00 |
| Monterey | 112,218 tons | 54,969 00 |
| Napa | 194,640 tons | 132,046 00 |
| Nevada | 100 tons | 50 00 |
| Orange | 22,925 tons | 20,155 00 |
| Riverside | 10,400 tons | 3,410 00 |
| Sacramento | 138,977 tons | 12,662 00 |
| San Bernardino | 10,359 tons | 5,180 00 |
| San Diego* | 25,820 tons | 13,337 00 |
| San Francisco | 20,390 tons | 15,040 00 |
| San Mateo | 26,900 tons | 8,070 00 |
| Santa Barbara | 3,971 tons | 1,888 00 |
| Santa Clara | 44,932 tons | 20,466 00 |
| Siskiyou | 4,872 tons | 609 00 |
| Sonoma† | 31,222 tons | 13,205 00 |
| Stanislaus | 215,414 tons | 63,572 00 |
| Trinity | 2,500 tons | 2,000 00 |
| Yuba | 64,531 tons | 15,526 00 |
| Totals | 2,657,685 tons | $841,588 00 |

*Including 400 tons moulding sand worth $1.50 per ton.
†Including 342 tons of chicken grit worth $6 per ton.

## Crushed Rock Production, by Counties, for 1912.

| County | Macadam | | Rubble | | Concrete | | Unclassified | |
|---|---|---|---|---|---|---|---|---|
| | Tons | Value | Tons | Value | Tons | Value | Tons | Value |
| Alameda | 290,404 | $198,141 | 33,633 | $22,418 | 101,488 | $62,017 | 52,531 | $30,571 |
| Butte | | | | | | | 73,889 | 40,026 |
| Colusa | | | 59,000 | 15,000 | | | | |
| Contra Costa | 215,000 | 125,500 | 25,000 | 25,000 | 273,500 | 205,750 | 55,000 | 35,100 |
| El Dorado | 4,000 | 2,800 | | | 2,000 | 1,500 | | |
| Fresno | | | | | | | 323,000 | 201,272 |
| Humboldt | 2,009 | 1,956 | | | 4,636 | 6,916 | 139,570 | 193,408 |
| Los Angeles | 318,185 | 197,210 | 4,866 | 8,604 | 173,855 | 142,084 | 772,596 | 482,953 |
| Madera | | | 12,851 | 3,213 | | | | |
| Marin | 600 | 400 | | | 3,500 | 2,000 | | |
| Merced | | | | | | | 90,000 | 45,000 |
| Monterey | 7,800 | 3,900 | 500 | 250 | 2,000 | 1,000 | | |
| Napa | 20,000 | 25,000 | 600 | 600 | | | 16,000 | 15,000 |
| Nevada | | | | | 100 | 500 | | |
| Orange | | | | | | | 1,850 | 1,129 |
| Placer | | | 5,614 | 2,328 | 15,825 | 5,256 | 2,470 | 494 |
| Riverside | 175,293 | 124,559 | 45,291 | 19,422 | 47,404 | 28,813 | 448,327 | 273,064 |
| Sacramento | 8,446 | 4,571 | 3,621 | 2,007 | | | 357,989 | 178,493 |
| San Benito | | | | | | | 186,127 | 83,232 |
| San Bernardino | | | 149,185 | 106,415 | 1,260 | 945 | 307,010 | 306,784 |
| San Diego | 5,800 | 3,770 | 20,594 | 13,386 | 72,780 | 76,360 | 412 | 412 |
| San Francisco | 70,600 | 66,580 | | | 33,456 | 26,900 | 52,892 | 42,627 |
| San Mateo | 25,146 | 20,117 | 200 | 200 | 500 | 400 | 1,000 | 800 |
| Santa Barbara | 5,919 | 7,792 | | | | | 1,400 | 1,260 |
| Santa Clara | 36,066 | 27,299 | | | 463 | 463 | | |
| Santa Cruz | 5,347 | 5,347 | | | 28,298 | 17,363 | | |
| Solano | 34,709 | 29,860 | | | | | 129,009 | 100,585 |
| Sonoma | 5,355 | 3,433 | | | | | 23,481 | 13,455 |
| Totals | 1,230,679 | $848,235 | 360,955 | $218,843 | 761,065 | $578,267 | 3,034,553 | $2,045,665 |

The following table will show the total value, by counties, of the stone industry production:

| County | Value | County | Value |
|---|---|---|---|
| Alameda | $420,283 00 | Plumas | $1,350 00 |
| Butte | 51,879 00 | Riverside | 567,309 00 |
| Colusa | 15,300 00 | Sacramento | 197,733 00 |
| Contra Costa | 478,162 00 | San Benito | 83,232 00 |
| El Dorado | 4,375 00 | San Bernardino | 580,824 00 |
| Fresno | 307,158 00 | San Diego | 164,115 00 |
| Glenn | 32,950 00 | San Francisco | 151,147 00 |
| Humboldt | 229,730 00 | San Mateo | 29,587 00 |
| Imperial | 10,000 00 | Santa Barbara | 17,480 00 |
| Inyo | 648 00 | Santa Clara | 48,228 00 |
| Los Angeles | 955,668 00 | Santa Cruz | 22,710 00 |
| Madera | 59,271 00 | Siskiyou | 609 00 |
| Marin | 3,000 00 | Solano | 130,445 00 |
| Mendocino | 300 00 | Sonoma | 295,198 00 |
| Merced | 45,000 00 | Stanislaus | 63,572 00 |
| Monterey | 60,119 00 | Trinity | 2,000 00 |
| Napa | 172,646 00 | Yuba | 15,526 00 |
| Nevada | 3,675 00 | | |
| Orange | 21,284 00 | Total | $5,473,928 00 |
| Placer | 231,415 00 | | |

COMPLIMENTS OF
F. McN. HAMILTON
STATE MINERALOGIST

CHAPTER FIVE

# INDUSTRIAL MATERIALS.

**Asbestos.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 38.

New uses and applications of manufactured asbestos products are constantly being made, and this branch of the mineral industry will some day be an important one in California. Ninety per cent of the crude asbestos used in the United States is imported, and while many deposits and surface indications of the mineral have long been known in this State, it is only recently that development work of any importance has been undertaken along these lines. The prices obtainable for this product vary widely, depending upon the quality of the fibre. Production for the year 1912, as reported to the State Mining Bureau, amounted to 90 tons, having a spot value of $2,700 as compared with 125 tons valued at $500 in 1911. Long fibre asbestos, suitable to the manufacture of tapestries, etc., is worth as high as $200 per ton.

**Barytes.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

Baryte is used principally in the paint industry, in the manufacture of paper and rope, in tanning leather and the refining of sugar. The demand, although comparatively small, is increasing. Crude barytes command a price of about $5 per ton, at the property.

Deposits of this mineral are known in Butte, Mariposa, San Bernardino and Shasta counties. Total production in the State for the year 1912 amounted to 564 tons valued at $2,812, as compared with the 1911 output of 309 tons worth $2,207.

Before marketing barytes the product is usually sorted and ground and in this condition it brings a spot price of from $10 to $14 per ton.

**Bauxite.**

*Reference:* Bulletin 38.

Bauxite, the ore from which metallic aluminum is derived, has been discovered in large quantity in southern California, and small deposits are also known in other parts of the State. No ore has been produced and sold, to date, although the outlook for such a condition is favorable and the increased uses which are continually being found for this meta practically guarantee another addition to California's long list of profitable mineral products.

Clay.

*Reference:* State Mineralogist Reports IV, IX, XII. Bulletin 38.

At one time or another in the history of the State, pottery clay has been quarried in thirty-three of its counties. In this report "pottery clay" refers to all clays used in the manufacture of red and brown earthenware, flower pots, tiling of all descriptions, architectural terra cotta, sewer pipe, etc., and the figures for amount and value are relative to the crude material at the pit, without reference to whether the clay was sold in the crude form, or whether it was immediately used in the manufacture of any of the above finished products by the producer.

The production as reported by operators for the year 1912 amounted to 199,605 tons valued at $215,683 as compared with an output of 224,576 tons worth $252,759 in 1911, a slight decrease both in amount and value.

A tabulation of the direct returns from producers, by counties, for the year 1912 is as follows:

| County | Amount | Value |
|---|---|---|
| Amador | 35,100 tons | $36,856 00 |
| Calaveras | 4,281 tons | 4,431 00 |
| Humboldt | 396 tons | 400 00 |
| Los Angeles | 11,929 tons | 12,028 00 |
| Monterey | 4,000 tons | 6,000 00 |
| Orange | 2,100 tons | 3,400 00 |
| Placer | 56,000 tons | 41,300 00 |
| Riverside | 72,046 tons | 93,418 00 |
| San Bernardino | 350 tons | 350 00 |
| San Diego | 403 tons | 500 00 |
| Santa Barbara | 12,000 tons | 16,000 00 |
| Ventura | 1,000 tons | 1,000 00 |
| Totals | 199,605 tons | $215,683 00 |

Feldspar.

The feldspars occur as constituents of nearly all rocks. The feldspar of commerce, however, is all obtained from pegmatites, where the crystals are large enough to admit of more or less sorting. The better grades of feldspar are used in pottery manufacture and in the making of various enamel wares. Where a high per cent of impurities is present the material is ground coarsely and used in the manufacture of "ready roofing," "chicken grit," etc. Small quantities are used in glass making, and as an abrasive in scouring soap. Attempts have been made to prove the value of the potash feldspars as fertilizer.

Feldspar was first commercially produced in California in 1910. During the year 1912, 1,382 tons were quarried and sold, the crude material at the property having a value of $6,180, as compared with the output of 1911 amounting to 740 tons worth $4,560.

**Fuller's Earth.**

*Reference:* Bulletin 38.

Fuller's earth, so named from its earliest use in fulling wool, is a rather rare, soft, friable rock whose value depends altogether on its texture and its filtering and absorbent properties. It has no definite composition, mineralogically, its physical properties rather than a chemical analysis determining its commercial value. Fuller's earth was first produced in the United States in the early nineties, and has been mined and marketed in a small way in California annually since 1899. During 1912 the output amounted to 876 tons having a spot value of $6,500 as compared with the production of the previous year of 466 tons worth $5,294, or an increase in amount of 410 tons and in value of $1,206.

**Gems.**

*Reference:* Bulletins 37, 64.

Gem production in California has shown a steady decline for the past two or three years. Seven counties reported a production value at $23,050 for the year 1912 as against eight counties which produced gems worth $51,824 in 1911. These values are for rough, uncut stones at the property, and are, of course, only a small per cent of the selling prices received for the stones when they are finished, cut and mounted. The figures given in the following table are the result of consultation with producers and dealers of this class of material throughout the State.

Gem deposits are located in many portions of the State, and the possible yield is very large. Unlike the "precious" stones, however, there is no definite value obtainable for these native gems; the demand is largely from the tourist trade and is exceedingly irregular, and there is a constant and growing competition with "paste" gems of every kind as well as with a growing list of artificially produced "stones."

The decline in production is not due to the above causes alone. There was a large overproduction of rough stones in 1910 and in several instances it is true that a stock of gems from that year is still on hand and uncut. On account of this overproduction, and the quietness of the business generally, one of the large firms which has been interested in gem mining in the State for years, withdrew from the field altogether. Their output, alone, for the year 1910 was greater than the entire production during 1912.

Notwithstanding the stagnant condition of this branch of the mineral industry, as a whole, considerable development work was carried on last year, Fresno and Riverside counties increased their production and San Bernardino County, which reported no output whatever in 1911, produced $450 worth of rough gems, consisting largely of turquoise and turquoise matrix. San Diego, Tulare and Siskiyou—the counties that contain the bulk of the gem deposits—fell off over 50 per cent, as com-

pared with the previous year. New discoveries continue to be made from time to time in Inyo County, but little development has taken place, to date.

The following summary shows the total value of crude gem stones produced in California during 1912:

| County | Value | |
|---|---|---|
| Fresno | $700 00 | Principally californite and rhodonite. |
| Los Angeles | 3,000 00 | Principally beach stones, agate, jasper. |
| Riverside | 800 00 | Principally tourmaline. |
| San Bernardino | 450 00 | Principally turquoise and matrix. |
| San Diego | 12,500 00 | Principally beryl, tourmaline, hyacinth. |
| Siskiyou | 250 00 | Principally rhodonite. |
| Tulare | 5,350 00 | Principally satelite, bloodstone, etc. |
| Total | $23,050 00 | |

**Graphite.**

*Reference:* State Mineralogist Report XIII.

No natural graphite was produced in California during 1912 although there are deposits of the mineral located in several counties in the State, and the owners of one property reported development work having been done in the course of the year with a possible output for 1913. Graphite deposits have been discovered, and exploited to some extent, in the following counties: Fresno, Los Angeles, Mendocino, San Bernardino, Siskiyou, Sonoma, and Tuolumne.

The demand for graphite shows a steady increase. Imports, largely from Mexico and Ceylon, amount to about $2,000,000 annually. On account of its infusibility and resistance to action of molten metals, graphite is very valuable in the manufacture of crucibles; it is also largely used in the manufacture of electrical appliances, as a steam packing, as a lubricant, in manufacture of paint and lead pencils, and in many other ways. Prices obtainable vary widely, depending upon the grade of the product, and upon its being amorphous or crystalline. The lowest grades bring about $10 per ton, and from this figure prices range up as high as $200 for the pure crystalline variety.

A few years ago only crystalline graphite of superior quality could be used in many of the arts and manufactures. Now inferior mineral may be concentrated by flotation, but the discovery that a fair grade of graphite could be manufactured from a good grade of coal has seriously hurt the mining of graphite, and lowered the price so that inferior mineral scarcely finds a sale, or can be concentrated at a profit.

**Gypsum.**

*Reference:* Bulletin 38.

Gypsum is used in the manufacture of plaster of paris, in the paper and glass industries, as a wall plaster, and to some extent as a fertilizer. Gypsum occurs most commonly as the well known "rock gypsum," although it is often found in the highly crystallized form known as selenite as well as in the fibrous state when it is known as satin spar. The material, as it is quarried in California, commonly carries a considerable per cent of impurities in the form of clay, limestone, etc. It is ordinarily ground and calcined before being marketed.

Gypsum production for the year 1912 amounted to 37,529 tons, the crude material having a spot value of $117,388, as compared with the 1911 output of 31,457 tons worth $101,475, showing that the demand for the year had an upward trend.

Four counties reported production, as will be seen by the following table, although deposits of this mineral are located in Butte, Colusa, Fresno, Los Angeles, Orange, Riverside, San Benito, San Luis Obispo, Santa Barbara, Tulare, and Ventura counties, as well.

Detailed production figures follow:

| County | Amount | Value |
|---|---|---|
| Kern | 8,479 tons | $18,188 00 |
| Kings | 50 tons | 200 00 |
| Monterey | 8,000 tons | 32,000 00 |
| San Bernardino | 21,000 tons | 67,000 00 |
| Totals | 37,529 tons | $117,388 00 |

**Infusorial Earth.**

*Reference:* State Mineralogist Reports II, XII, XIII. Bulletin 38.

Infusorial earth, also known as diatomaceous earth, tripoli and tripolite, occurs in California very extensively. Deposits of importance are located in Los Angeles, Monterey, Orange, San Benito, San Bernardino, San Luis Obispo, Santa Barbara, Shasta, and Tehama counties.

The production for 1912 amounted to 4,129 tons valued at $17,074, as compared with 2,194 tons valued at $19,670 quarried and sold during the previous year. Only two counties contributed to the total:

| County | Amount | Value |
|---|---|---|
| Monterey | 3,000 tons | $4,000 00 |
| Santa Barbara | 1,129 tons | 13,074 00 |
| Totals | 4,129 tons | $17,074 00 |

Infusorial earth is not soluble in acids, is very light, and extremely porous. It is used as an absorbent, is a first class non-conductor of

heat, is utilized in the manufacture of refractory brick, as a polishing powder, in scouring soaps, etc.

**Limestone.**

*Reference:* State Mineralogist Reports IV, XII. Bulletin 38.

Eleven counties reported a production of limestone in 1912 amounting to 613,375 tons worth $570,248 at the quarry. This is a decided increase over the 1911 production when thirteen counties contributed to a total output of 516,398 tons valued at $452,790.

Limestone is used as a flux by smelters; in the refining of sugar; in manufacture of carbonic acid; as a fertilizer for "sour" soils; and in the manufacture of glass, paper and mineral wool, and in other ways.

These figures represent, as far as it has been possible to make them do so, limestone used as such. If operators report limestone production which has been crushed and used as macadam, it has been classified as macadam in this report and not as limestone. When the stone has been quarried for use in the manufacture of cement such tonnages have been excluded altogether here as it would be a duplication of values to add both the cement and limestone figures in the general total. Many of the reports received by the State Mining Bureau, however, make no definite mention of the use to which the material was put, and unless otherwise known, such data comprises the following tabulation which apportions the total limestone production in California during the year 1912 among the various producing counties:

| County | Amount | Value |
|---|---|---|
| Contra Costa | 25,879 tons | $45,291 00 |
| Monterey | 6,000 tons | 8,000 00 |
| Placer | 222,595 tons | 200,000 00 |
| Riverside | 90,831 tons | 63,582 00 |
| San Bernardino | 80,186 tons | 97,867 00 |
| San Mateo | 102,300 tons | 66,495 00 |
| Santa Barbara | 5,327 tons | 11,666 00 |
| Santa Clara | 3,374 tons | 4,120 00 |
| Santa Cruz | 7,307 tons | 7,553 00 |
| Shasta | 58,022 tons | 45,575 00 |
| Tuolumne | 11,554 tons | 20,099 00 |
| Totals | 613,375 tons | $570,248 00 |

**Manganese.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 38.

Manganese ores are found widely distributed throughout the State and a production, usually small, has been annually reported for the past quarter of a century. During 1912 the output amounted to only 22 tons valued at $400, the material being marketed from Alameda and Plumas counties. Manganese is used most extensively in the steel industry; minor uses are in the paint, glass and pottery industries, in chemistry, etc.

**Mica.**

*Reference:* State Mineralogist Report II. Bulletin 38.

According to the records of the State Mining Bureau the total production of mica in California has been but 150 tons valued at $9,300. This output was recorded during the years 1902, 1903, 1904. Most of the mica found in the State to date has been of too poor a grade to find a ready market. A discovery of this material in Los Angeles County has been recently reported, although but little development has been done to ascertain its real value.

Lithia mica was produced in San Diego County, 1900–1905, but none has been sold since. This mineral is used in the manufacture of artificial mineral water, in making effervescing lithia tablets, and to some extent in manufacturing "fireworks."

**Mineral Paint.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 38.

Mineral paint to the amount of 300 tons having a spot value of $1,800 was produced in California during 1912. This figure applies to the crude ore. This is an increase over the 1911 figures of 114 tons in amount and $616 in value. Mineral paint deposits have been discovered in the following counties: Butte, Calaveras, Los Angeles, Napa, Nevada, Placer, Riverside, Siskiyou, Sonoma, Stanislaus, Trinity and Yuba. There has been a small annual output of this material in the State since 1890, at which date the first production was reported.

**Mineral Water.**

*Reference:* State Mineralogist Reports VI, XII, XIII.

Eighteen counties reported a commercial production of mineral water during 1912 to the amount of 2,497,794 gallons valued at $529,384. These figures refer to mineral water actually bottled and sold. Hundreds of thousands of gallons are used at the springs for bathing and other purposes of which no reliable data can be compiled, and millions of gallons annually run to waste.

Prices obtained for the different waters vary greatly because of the great difference in the analysis of the water from the several springs and the consequent demand for same.

Detailed production figures for 1912 are as follows:

| County | Amount | Value |
|---|---|---|
| Calaveras | 7,528 gals. | $3,764 00 |
| Colusa | 165,330 gals. | 39,061 00 |
| Contra Costa | 200,000 gals. | 10,000 00 |
| Lake | 202,000 gals. | 114,500 00 |
| Los Angeles | 76,495 gals. | 6,333 00 |
| Marin | 260,000 gals. | 31,000 00 |
| Monterey | 20,000 gals. | 7,000 00 |
| Napa | 136,750 gals. | 81,997 00 |
| Riverside | 44,256 gals. | 4,250 00 |
| San Benito | 2,600 gals. | 1,240 00 |
| San Diego | 52,060 gals. | 17,218 00 |
| San Luis Obispo | 2,500 gals. | 625 00 |
| Santa Barbara | 105,000 gals. | 11,550 00 |
| Santa Clara | 152,500 gals. | 10,250 00 |
| Shasta | 23,225 gals. | 5,646 00 |
| Siskiyou | 700,000 gals. | 120,000 00 |
| Solano | 285,050 gals. | 44,000 00 |
| Sonoma | 62,500 gals. | 20,950 00 |
| Totals | 2,497,794 gals. | $529,384 00 |

**Pumice.**

*Reference:* State Mineralogist Report XII (*see* Tufa). Bulletin 38.

One hundred tons of pumice were produced in California during 1912 having a spot value of $25 per ton. Deposits of this material have been long known in various parts of the State but only once before has an actual commercial production of pumice stone been reported to the State Mining Bureau. Its principal use is for abrasive purposes.

**Pyrite.**

*Reference:* Bulletin 38.

Pyrite production in California during 1912 amounted to 69,872 tons, the value of the crude ore at the property being $203,470, or an average of $2.91 per ton. This shows an increase of 15,647 tons, and $20,516 in value, over the 1911 output of 54,225 tons valued at $182,954, although the average value per ton decreased 46 cents. The pyrite here referred to was that actually used in the manufacture of sulphuric acid, many thousand tons being annually treated for other than their sulphur content. The output by counties for the two years is as follows:

| County | 1911 | | 1912 | |
|---|---|---|---|---|
| | Amount | Value | Amount | Value |
| Alameda | 6,340 tons | $31,352 00 | 7,267 tons | $29,068 00 |
| Shasta | 47,885 tons | 151,602 00 | 62,605 tons | 174,402 00 |
| Totals | 54,225 tons | $182,954 00 | 69,872 tons | $203,470 00 |

**Sand Glass.**

*Reference:* State Mineralogist Report IX (*see* Glass) Bulletin 38

Most of the glass sand used in the State is imported, although the domestic production is increasing owing to the development of deposits of better grades of material than formerly. During 1912 the output amounted to 13,075 tons valued at $15,404, at the property, as compared with the 1911 production of 8,620 tons worth $8,672.

**Soapstone.**

*Reference:* State Mineralogist Report XII. Bulletin 38.

Small amounts of soapstone have been marketed in California intermittently since 1893. The industry has never been developed to any great extent as yet, although the possible production is quite large. During 1912 the output amounted to 1,750 tons with a spot value of $7,350 for the crude material. It is used in making paper, soap, lubricants, tiling, etc., and when ground through a 200-mesh screen is worth about $15 per ton.

**Sulphur.**

*Reference:* State Mineralogist Reports IV, XIII. Bulletin 38.

Sulphur is deposited from solution at certain mineral springs in the northern portion of the State. Other areas contain rocks from which it is possible to distill pure sulphur. Active production of this mineral is improbable, however, at the present time.

CHAPTER SIX.

# SALINES.

**Borax.**

*Reference:* State Mineralogist Reports III, X, XII, XIII. Bulletin 24.

Deposits of borax are known in Inyo, Kern, Lake, Los Angeles, Imperial, San Bernardino, Solano, Tehama, and Ventura counties. In the desert portions of the State its occurrence is more or less common in the beds of ancient lakes. In other places it is mined as an ore, chiefly colemanite, which occurs in vein-like masses. The output in California, which is the sole domestic source of borax, in 1912 amounted to 42,135 tons valued at $1,122,713 as compared with the 1911 output of 50,945 tons worth $1,456,672.

The above tonnage refers to the crude ore and the value is determined by the available boracic acid present, which is worth one dollar per unit.

**Nitrates.**

*Reference:* Bulletin 24.

Sodium nitrate deposits of unknown extent have long been known in that portion of San Bernardino and Inyo counties commonly called the Death Valley region. There has never been a commercial production of this salt in California.

**Potash.**

A great deal of interest has been taken recently in occurrence of potash in the desert regions of the State. The only literature on the subject is in the form of a few brief reports by the U. S. Geological Survey. There has been no commercial production of this material in California, to date.

**Salt.**

*Reference:* State Mineralogist Reports II, XII, XIII. Bulletin 24.

The California salt output is derived from the following sources: The waters of the Pacific Ocean by evaporation, this branch of the industry being carried on principally on the shores of San Francisco Bay, as well as at Long Beach and San Diego; from the old lake beds from the desert portions of the State, where many thousand acres of saline deposits exist; and from deposits of rock salt which are found extensively in San Bernardino County.

During 1912 seven counties reported a production of 185,721 tons

having a value of $383,370 in the stack, an average of a little over two dollars per ton. As compared with the 1911 figures, when 173,332 tons were produced worth $324,255 it will be noted that there is considerable increase both in amount and value of this product.

Detailed figures, by counties, are as follows:

| County | Amount | Value |
|---|---|---|
| Alameda | 126,211 tons | $212,150 00 |
| Los Angeles | 10,360 tons | 46,370 00 |
| Modoc | 50 tone | 800 00 |
| San Bernardino | 3,600 tons | 12,600 00 |
| San Diego | 12,450 tons | 31,350 00 |
| San Mateo | 33,000 tons | 80,000 00 |
| Solano | 50 tons | 100 00 |
| Totals | 185,721 tons | $383,370 00 |

**Soda.**

*Reference:* State Mineralogist Reports XII, XIII. Bulletin 24.

Deposits of soda are located in various parts of southern California more especially in Inyo, San Bernardino and San Luis Obispo counties. The 1912 production amounted to 7,200 tons, valued at $37,094, as compared with an output of 9,023 tons valued at $52,887 in 1911.

CHAPTER SEVEN.

# MINERAL PRODUCTION BY COUNTIES.

Under the following County headings will be given, first, a list of the mineral resources of the county, reports upon which have been received by the State Mining Bureau, followed by a tabulation showing quantity and value of the mineral output for 1912:

**Alameda.**

MINERAL RESOURCES.—Asphalt, chrome, brick, clay, coal, gypsum, magnesite, manganese, petroleum, pyrite, salt, soapstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 12,800 M | $133,100 00 |
| Manganese | 20 tons | 360 00 |
| Pyrite | 7,267 tons | 29,068 00 |
| Salt | 126,211 tons | 212,150 00 |
| Stone industry | | 420,283 00 |
| Total | | $794,961 00 |

**Alpine.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Gold and silver.

Gold and silver output included in Stanislaus total.

**Amador.**

MINERAL RESOURCES.—Asbestos, brick, chrome, clay, coal, copper, gold, lime, sandstone, silver, soapstone.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 2,500 M | $25,000 00 |
| Clay | 35,100 tons | 36,856 00 |
| Copper | 175,608 lbs. | 28,975 00 |
| Gold | | 2,796,194 00 |
| Lime | 800 bbls. | 1,040 00 |
| Sandstone | 6,000 cu. ft. | 3,000 00 |
| Silver | | 32,037 00 |
| Soapstone | 700 tons | 2,100 00 |
| Total | | $2,925,202 00 |

*See page 28.

**Butte.**

MINERAL RESOURCES.—Gems, gold, limestone, marble, mineral water, platinum, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| Gold | $2,346,229 00 |
| Silver | 5,567 00 |
| *Stone industry | 51,879 00 |
| Total | $2,403,675 00 |

**Calaveras.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Asbestos, chrome, clay, copper, gold, limestone, marble, mineral water, platinum, pyrite, quartz crystals, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Clay | 4,281 tons | $4,431 00 |
| Copper | 6,125,415 lbs. | 1,010,693 00 |
| Gold | | 962,145 00 |
| Mineral water | 7,528 gals. | 3,764 00 |
| Silver | | 70,748 00 |
| Total | | $2,051,781 00 |

**Colusa.**

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Copper, mineral water, petroleum, quicksilver, silver, sandstone, stone industry, gold.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Mineral water | 165,330 gals. | $39,061 00 |
| Sandstone | 51,137 cu. ft. | 15,804 00 |
| *Stone industry | | 15,300 00 |
| Total | | $70,165 00 |

**Contra Costa.**

MINERAL RESOURCES.—Asphalt, cement, brick, clay, coal, limestone, lime, mineral water, stone industry.

*See page 28.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 32,621 M | $283,718 00 |
| Lime | 14,870 bbls. | 12,640 00 |
| Limestone | 25,879 tons | 45,291 00 |
| Mineral water | 200,000 gals. | 10,000 00 |
| Stone industry | | 478,162 00 |
| Total | | $829,811 00 |

**Del Norte.**

MINERAL RESOURCES.—Chrome, gold, silver, stone industry, copper.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| Gold | $3,940 00 |
| Silver | 10 00 |
| Total | $3,950 00 |

**El Dorado.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Asbestos, cement, copper, gold, limestone, quicksilver, glass sand, slate, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gold | | $105,565 00 |
| Lime | 14,023 bbls. | 11,218 00 |
| Silver | | 843 00 |
| Stone industry | | 4,375 00 |
| Total | | $122,001 00 |

**Fresno.**

MINERAL RESOURCES.—Asphalt, brick, chrome, copper, gems, gold, magnesite, petroleum, quicksilver, stone industry, silver, natural gas.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 5,000 M | $40,000 00 |
| Chrome | 50 tons | 950 00 |
| Gems | | 700 00 |
| Gold | | 6,094 00 |
| Magnesite | 2,000 tons | 20,000 00 |
| Natural gas | | 21,380 00 |
| Petroleum | 19,510,932 bbls. | 8,487,255 00 |
| Quicksilver | 336 flasks | 14,125 00 |
| Stone industry | | 307,158 00 |
| Silver | | 23 00 |
| Total | | $8,897,685 00 |

*See page 28.

**Glenn.**

MINERAL RESOURCES.—Chrome, manganese, sandstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| *Stone industry | $32,950 00 |
| Total | $32,950 00 |

**Humboldt.**

MINERAL RESOURCES.—Brick, clay, copper, gold, silver, mineral water, natural gas, platinum, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 772 M | $6,415 00 |
| Clay | 396 tons | 400 00 |
| Gold | | 31,271 00 |
| Natural gas | | 150 00 |
| Silver | | 150 00 |
| *Stone industry | | 229,730 00 |
| Total | | $268,116 00 |

**Imperial.**

MINERAL RESOURCES.—Brick, gold, lead, marble, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 3,250 M | $20,000 00 |
| *Stone industry | | 10,000 00 |
| Total | | $30,000 00 |

**Inyo.**

MINERAL RESOURCES.—Antimony, borax, cement, gold, copper, lead marble, mineral water, nitrate, soapstone, salt, soda, silver, stone industry, zinc.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Copper | 48,584 lbs. | $8,016 00 |
| Gold | | 369,758 00 |
| Lead | 1,207,593 lbs. | 54,342 00 |
| Silver | | 45,316 00 |
| Soapstone | 1,050 tons | 5,250 00 |
| *Stone industry | | 648 00 |
| Total | | $483,330 00 |

*See page 28.

**Kern.**

MINERAL RESOURCES.—Antimony, asbestos, asphalt, brick, cement, copper, fuller's earth, gypsum, gold, lime, limestone, magnesite, mineral paint, natural gas, petroleum, potash, salt, soda, silver, stone industry, tungsten, molybdenum.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 1,890 M | $23,120 00 |
| Gold | | 830,421 00 |
| Gypsum | 8,479 tons | 18,188 00 |
| Lead | 19,664 lbs. | 885 00 |
| Lime | 162,831 bbls. | 124,894 00 |
| Natural gas | | 325,484 00 |
| Petroleum | 51,448,067 bbls. | 21,762,532 00 |
| Silver | | 11,480 00 |
| Total | | $23,097,003 00 |

**Kings.**

MINERAL RESOURCES.—Brick, gypsum, mineral paint, natural gas, petroleum.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gypsum | 50 tons | $200 00 |
| Natural gas | | 1,650 00 |
| Total | | $1,850 00 |

**Lake.**

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Mineral water, quicksilver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Mineral water | 202,000 gals. | $114,500 00 |
| Quicksilver | 209 flasks | 8,786 00 |
| Total | | $123,286 00 |

**Lassen.**

MINERAL RESOURCES.—Copper, gold, silver.

No commercial production for 1912 reported.

**Los Angeles.**

MINERAL RESOURCES.—Asphalt, borax, cement, chrome, brick, clay, fuller's earth, gems, gold, gypsum, infusorial earth, iron, limestone, marble, mineral paint, mineral water, natural gas, petroleum, salt, glass sand, sandstone, serpentine, silver, soapstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 174,862 M | $1,692,258 00 |
| Clay | 11,929 tons | 12,028 00 |
| Gems | | 3,000 00 |
| Gold (included in Monterey total) | | |
| Mineral water | 76,495 gals. | 6,333 00 |
| Natural gas | | 78,672 00 |
| Petroleum | 4,484,590 bbls. | 2,798,384 00 |
| Salt | 10,360 tons | 46,370 00 |
| Sand, glass | 1,800 tons | 1,800 00 |
| *Stone industry | | 955,668 00 |
| Total | | $5,594,513 00 |

**Madera.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Brick, copper, gold, lead, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 300 M | $1,500 00 |
| Copper | 248,129 lbs. | 40,941 00 |
| Gold | | 9,162 00 |
| Lead | 5,533 lbs. | 249 00 |
| Silver | | 1,162 00 |
| *Stone industry | | 59,271 00 |
| Total | | $112,285 00 |

**Marin.**

MINERAL RESOURCES.—Brick, mineral water, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 18,000 M | $88,200 00 |
| Mineral water | 260,000 gals. | 31,000 00 |
| *Stone industry | | 3,000 00 |
| Total | | $122,200 00 |

**Mariposa.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Barytes, copper, gold, marble, silver, slate, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Copper | 284,587 lbs. | $46,957 00 |
| Gold | | 160,541 00 |
| Silver | | 6,796 00 |
| Total | | $214,294 00 |

*See page 28.

**Mendocino.**

MINERAL RESOURCES.—Brick, copper, gold, mineral water, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| *Stone industry | $300 00 |
| Total | $300 00 |

**Merced.**

MINERAL RESOURCES.—Antimony, brick, clay, gold, slate, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| Gold (included in Stanislaus total) | |
| *Stone industry | $45,000 00 |
| Total | $45,000 00 |

**Modoc.**

MINERAL RESOURCES.—Coal, gold, quicksilver, salt, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gold | | $27,893 00 |
| Silver | | 494 00 |
| Salt | 50 tons | 800 00 |
| Total | | $29,187 00 |

**Mono.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Copper, gold, lead, limestone, onyx, petroleum, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Copper | 8,179 lbs. | $1,350 00 |
| Gold | | 377,518 00 |
| Lead | 23,936 lbs. | 1,077 00 |
| Lime | 4,961 bbls. | 3,721 00 |
| Silver | | 70,602 00 |
| Total | | $454,268 00 |

*See page 28.

**Monterey.**

*Reference:* State Mineralogist Report XII.

MINERAL RESOURCES.—Cement, brick, clay, coal, copper, feldspar, fuller's earth, gold, gypsum, infusorial earth, limestone, mineral water, petroleum, quicksilver, glass sand, sandstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Clay | 4,000 tons | $6,000 00 |
| †Gold | | 7,647 00 |
| Gypsum | 8,000 tons | 32,000 00 |
| Infusorial earth | 3,000 tons | 4,000 00 |
| Limestone | 6,000 tons | 8,000 00 |
| Mineral water | 20,000 gals. | 7,000 00 |
| Sand, glass | 9,016 tons | 7,916 00 |
| Silver | | 67 00 |
| *Stone industry | | 60,119 00 |
| Total | | $132,749 00 |

**Napa.**

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Cement, petroleum, mineral water, quicksilver, sandstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Mineral water | 136,750 gals. | $81,997 00 |
| Quicksilver | 287 flasks | 12,065 00 |
| *Stone industry | | 172,646 00 |
| Total | | $266,708 00 |

**Nevada.**

*Reference:* State Mineralogist Report X.

MINERAL RESOURCES.—Copper, gold, pyrites, mineral paint, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gold | | $2,081,958 00 |
| Lead | 1,785 lbs. | 80 00 |
| Silver | | 22,830 00 |
| *Stone industry | | 3,675 00 |
| Total | | $2,108,543 00 |

*See page 28.

†Including Los Angeles and San Luis Obispo counties.

Orange.

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Brick, clay, coal, gold, petroleum, natural gas, sandstone, silver, stone industry, tin.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 1,300 M | $9,100 00 |
| Clay | 2,100 tons | 3,400 00 |
| Natural gas | | 5,250 00 |
| Petroleum | 6,704,421 bbls. | 4,478,553 00 |
| Sand, glass | 459 tons | 688 00 |
| Stone industry | | 21,284 00 |
| Total | | $4,518,275 00 |

Placer.

MINERAL RESOURCES.—Asbestos, brick, clay, copper, gold, limestone, manganese, magnesite, quartz crystals, glass sand, silver, stone industry, talc.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 900 M | $21,250 00 |
| Clay | 56,000 tons | 41,300 00 |
| Copper | 78,170 lbs. | 12,898 00 |
| Gold | | 367,383 00 |
| Limestone | 222,595 tons | 200,000 00 |
| Magnesite | 50 tons | 500 00 |
| Sand, glass | 1,000 tons | 2,000 00 |
| Silver | | 4,791 00 |
| Stone industry | | 231,415 00 |
| Total | | $881,537 00 |

Plumas.

MINERAL RESOURCES.—Copper, gold, lead, limestone, granite, manganese, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Copper | 6,963 lbs. | $1,149 00 |
| Gold | | 193,237 00 |
| Lead | 5,856 lbs. | 264 00 |
| Manganese | 2 tons | 40 00 |
| Silver | | 957 00 |
| Stone industry | | 1,350 00 |
| Total | | $196,997 00 |

*See page 28.

**Riverside.**

MINERAL RESOURCES.—Asbestos, cement, brick, clay, coal, copper, gems, gold, graphite, iron, lead, gypsum, limestone, magnesite, marble, mineral paint, mineral water, salt, glass sand, tin, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 2,500 M | $20,000 00 |
| Clay | 72,046 tons | 93,418 00 |
| Copper | 6,000 lbs. | 990 00 |
| Gems | | 800 00 |
| Gold | | 20,202 00 |
| Lead | 929 lbs. | 42 00 |
| Limestone | 90,831 tons | 63,582 00 |
| Magnesite | 878 tons | 8,780 00 |
| Mineral water | 44,256 gals. | 4,250 00 |
| Sand, glass | 800 tons | 3,000 00 |
| Silver | | 254 00 |
| *Stone industry | | 567,309 00 |
| Total | | $782,627 00 |

**Sacramento.**

MINERAL RESOURCES.—Brick, clay, gold, natural gas, platinum, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 26,073 M | $161,535 00 |
| Gold | | 1,712,587 00 |
| Natural gas | | 96,000 00 |
| Silver | | 3,544 00 |
| *Stone industry | | 197,733 00 |
| Total | | $2,171,399 00 |

**San Benito.**

MINERAL RESOURCES.—Antimony, bituminous rock, cement, coal, copper, gems, limestone, manganese, mineral water, pyrites, quicksilver, stone industry, petroleum.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Mineral water | 26,000 gals. | $1,240 00 |
| Quicksilver | 9,743 flasks | 409,596 00 |
| *Stone industry | | 83,232 00 |
| Total | | $494,068 00 |

*See page 28.

an Bernardino.

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Aluminum, barytes, borax, cement, brick, clay, opper, gems, gold, gypsum, iron, lead, limestone, marble, mineral water, ineral paint, nitrate, petroleum, potash, salt, soapstone, silver, soda, tone industry, tellurium, tungsten, vanadium, tufa, zinc.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| lay | 350 tons | $350 00 |
| opper | 1,937,185 lbs. | 319,636 00 |
| ems | | 450 00 |
| old | | 293,900 00 |
| ypsum | 21,000 tons | 67,000 00 |
| ead | 94,852 lbs. | 4,268 00 |
| imestone | 80,186 tons | 97,867 00 |
| ineral paint | 200 tons | 1,200 00 |
| alt | 3,600 tons | 12,600 00 |
| ilver | | 49,962 00 |
| tone industry | | 580,824 00 |
| Total | | $1,428,057 00 |

an Diego.

*Reference:* State Mineralogist Report VI, XI.

MINERAL RESOURCES.—Asphalt, brick, clay, copper, gems, gold, lithia ica, marble, mineral water, petroleum, potash, salt, silver, stone ndustry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| rick | 10,500 M | $80,000 00 |
| lay | 403 tons | 500 00 |
| ems | | 12,500 00 |
| ineral water | 52,060 gals. | 17,218 00 |
| alt | 12,450 tons | 31,350 00 |
| tone industry | | 164,115 00 |
| Total | | $305,683 00 |

an Francisco.

MINERAL RESOURCES.—Clay, stone industry, asphalt.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| tone industry | $151,147 00 |
| Total | $151,147 00 |

*See page 28.

**San Joaquin.**

MINERAL RESOURCES.—Brick, manganese, natural gas, glass sand.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 6,128 M | $64,874 00 |
| Natural gas | | 145,166 00 |
| Total | | $210,040 00 |

**San Luis Obispo.**

MINERAL RESOURCES.—Asphalt, bituminous rock, brick, coal, copper, gold, gypsum, infusorial earth, limestone, marble, mineral water, onyx, petroleum, quicksilver, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Bituminous rock | 807 tons | $1,472 00 |
| Gold (included in Monterey) | | |
| Mineral water | 2,500 gals. | 625 00 |
| Petroleum | 2,129 bbls. | 1,469 00 |
| Quicksilver | 666 flasks | 27,998 00 |
| Total | | $31,564 00 |

**San Mateo.**

MINERAL RESOURCES.—Brick, gems, limestone, salt, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 1,400 M | $40,500 00 |
| Limestone | 102,300 tons | 66,495 00 |
| Salt | 33,000 tons | 80,000 00 |
| *Stone industry | | 29,587 00 |
| Total | | $216,582 00 |

*See page 28.

anta Barbara.

MINERAL RESOURCES.—Asphalt, bituminous rock, brick, clay, infusorial earth, lime, limestone, mineral water, natural gas, petroleum, quicksilver, sandstone, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| rick | 2,615 M | $17,150 00 |
| ituminous rock | 11,120 tons | 5,556 00 |
| lay | 12,000 tons | 16,000 00 |
| nfusorial earth | 1,129 tons | 13,074 00 |
| ime | 17,500 bbls. | 16,434 00 |
| imestone | 5,327 tons | 11,666 00 |
| lineral water | 105,000 gals. | 11,550 00 |
| atural gas | | 253,633 00 |
| etroleum | 6,862,719 bbls. | 3,747,045 00 |
| andstone | 4,500 cu. ft. | 1,670 00 |
| tone industry | | 17,480 00 |
| Total | | $4,111,258 00 |

anta Clara.

MINERAL RESOURCES.—Brick, clay, limestone, magnesite, manganese, ineral water, petroleum, quicksilver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| rick | 18,000 M | $105,000 00 |
| ime | 13,508 bbls. | 10,154 00 |
| imestone | 3,374 tons | 4,120 00 |
| agnesite | 600 tons | 6,000 00 |
| ineral water | 152,500 gals. | 10,250 00 |
| etroleum | 14,092 bbls. | 8,295 00 |
| uicksilver | 8,695 flasks | 365,538 00 |
| tone industry | | 48,228 00 |
| Total | | $557,585 00 |

anta Cruz.

MINERAL RESOURCES.—Bituminous rock, cement, gold, lime, limestone, etroleum, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| ituminous rock | 32,146 tons | $80,439 00 |
| ime | 169,646 bbls. | 159,505 00 |
| imestone | 7,307 tons | 7,553 00 |
| tone industry | | 22,710 00 |
| Total | | $270,207 00 |

*See page 28.

**Shasta.**

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Asbestos, barytes, brick, chrome, copper, iron gold, lime, limestone, mineral water, pyrite, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 1,697 M | $10,195 ( |
| Chrome | 1,000 tons | 8,000 ( |
| Copper | 25,249,892 lbs. | 4,166,232 ( |
| Gold | | 986,803 ( |
| Lime | 6,529 bbls. | 3,584 ( |
| Limestone | 58,022 tons | 45,575 ( |
| Mineral water | 23,225 gals. | 5,646 ( |
| Pyrite | 62,605 tons | 174,402 ( |
| Silver | | 425,382 ( |
| Total | | $5,825,819 ( |

**Sierra.**

MINERAL RESOURCES.—Asbestos, copper, gold, lead, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Copper | 1,285 lbs. | $212 |
| Gold | | 732,988 |
| Lead | 9,919 lbs. | 446 |
| Silver | | 2,777 |
| Total | | $736,423 |

**Siskiyou.**

MINERAL RESOURCES.—Brick, chrome, coal, copper, gems, gold, lim limestone, marble, mineral water, pumice stone, quicksilver, sandston silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Chrome | 220 tons | $2,310 |
| Gems | | 250 |
| Gold | | 472,314 |
| Mineral water | 700,000 gals. | 120,000 |
| Sandstone | 250 cu. ft. | 250 |
| Silver | | 2,980 |
| *Stone industry | | 609 |
| Total | | $598,713 |

*See page 28.

olano.

MINERAL RESOURCES.—Bituminous rock, brick, cement, clay, fuller's rth, limestone, mineral water, natural gas, onyx, petroleum, quick-lver, salt, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| rick | 2,200 M | $20,000 00 |
| ineral water | 285,050 gals. | 44,000 00 |
| atural gas | | 8,528 00 |
| lt | 50 tons | 100 00 |
| tone industry | | 130,445 00 |
| Total | | $203,073 00 |

onoma.

MINERAL RESOURCES.—Brick, crome, clay, copper, graphite, magnesite, arble, mineral paint, mineral water, petroleum, quicksilver, stone dustry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| agnesite | 300 tons | $3,000 00 |
| ineral water | 62,500 gals. | 20,950 00 |
| uicksilver | 646 flasks | 27,158 00 |
| tone industry | | 295,198 00 |
| Total | | $346,306 00 |

anislaus.

MINERAL RESOURCES.—Brick, clay, gold, manganese, mineral paint, uicksilver, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| rick | 250 M | $2,000 00 |
| old (including Alpine and Merced) | | 227,527 00 |
| ineral paint | 100 tons | 600 00 |
| lver | | 1,974 00 |
| tone industry | | 63,572 00 |
| Total | | $295,673 00 |

utter.

MINERAL RESOURCES.—Clay.

No commercial production for 1912 was reported.

*See page 28.

**Tehama.**

*Reference:* State Mineralogist Report XI.

MINERAL RESOURCES.—Brick, chrome, copper, gold, marble, minera water, petroleum, salt, stone industry, silver.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 225 M | $1,300 |
| Total | | $1,300 |

**Trinity.**

MINERAL RESOURCES.—Copper, gold, platinum, quicksilver, silve stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gold | | $723,503 |
| Quicksilver | 18 flasks | 758 |
| Silver | | 7,494 |
| *Stone industry | | 2,000 |
| Total | | $733,755 |

**Tulare.**

MINERAL RESOURCES.—Asphalt, brick, clay, feldspar, gems, infusori earth, magnesite, marble, natural gas, petroleum, glass sand, soapston stone industry, zinc.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Brick | 10,900 M | $70,500 |
| Gems | | 5,350 |
| Magnesite | 6,684 tons | 66,840 |
| Marble | 100 cu. ft. | 200 |
| Total | | $142,890 |

**Tuolumne.**

MINERAL RESOURCES.—Chrome, clay, copper, gold, lime, limeston marble, mineral paint, platinum, soapstone, silver, stone industr sulphur.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| Gold | | $1,113,291 |
| Lime | 117,450 bbls. | 121,250 |
| Limestone | 11,554 tons | 20,099 |
| Marble | 27,720 cu. ft. | 73,920 |
| Silver | | 25,146 |
| Total | | $1,353,706 |

*See page 28.

ntura.

MINERAL RESOURCES.—Asphalt, borax, brick, cement, clay, gold, mineral water, natural gas, petroleum, sandstone, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Quantity | Value |
|---|---|---|
| ick | 550 M | $3,575 00 |
| ay | 1,000 tons | 1,000 00 |
| tural gas | | 4,163 00 |
| troleum | 662,300 bbls. | 584,811 00 |
| ndstone | 4,600 cu. ft. | 1,850 00 |
| Total | | $595,399 00 |

lo.

MINERAL RESOURCES.—Quicksilver, sandstone.

No commercial production for 1912 was reported.

ba.

MINERAL RESOURCES.—Brick, clay, gold, platinum, silver, stone industry.

Commercial production for 1912 was as follows:

| Mineral | Value |
|---|---|
| ld | $2,753,408 00 |
| ver | 6,198 00 |
| tone industry | 15,526 00 |
| Total | $2,775,132 00 |

apportioned.

NOTE.—The figures included under "unapportioned" are necessary cause of the fact that some branches of the mineral industry are so ntralized that if the value of their output were listed under the county om which they come private business would be made public. For this ason there are several instances where the real value of the county neral yield is much greater than is shown in the foregoing tables.

| Mineral | Quantity | Value |
|---|---|---|
| bestos | 90 tons | $2,700 00 |
| rytes | 564 tons | 2,812 00 |
| rax | 42,135 tons | 1,122,713 00 |
| ment | 6,198,634 bbls. | 6,074,661 00 |
| al | 14,848 tons | 39,092 00 |
| ldspar | 1,382 tons | 6,180 00 |
| ller's earth | 876 tons | 6,500 00 |
| n ore | 2,508 tons | 2,508 00 |
| atinum | 603 oz. | 19,731 00 |
| mice | 100 tons | 2,500 00 |
| da | 7,200 tons | 37,094 00 |
| ngsten | 8,042 tons | 206,000 00 |
| c | 4,331,391 lbs. | 298,866 00 |
| Total | | $7,821,357 00 |

*See page 28.

# APPENDIX.

## PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU.

Publications of this Bureau will be sent on receipt of the requisite amount and postage. Only stamps, coin or money orders will be accepted in payment.

Money orders should be made payable to the STATE MINING BUREAU.

*Personal checks will not be accepted.*

### REPORTS.

Asterisk (*) indicates the publication is out of print.

| | | | Price. | Postage |
|---|---|---|---|---|
| *Report | I. | Henry G. Hanks. 1880. | | |
| *Report | II. | Henry G. Hanks. 1882. | | |
| *Report | III. | Henry G. Hanks. 1883. | | |
| *Report | IV. | Henry G. Hanks. 1884. | | |
| *Report | V. | Henry G. Hanks. 1885. | | |
| *Report | VI—Part 1. | Henry G. Hanks. 1886. | | |
| *Report | VI—Part 2. | Wm. Irelan, Jr. 1886. | | |
| *Report | VII. | Wm. Irelan, Jr. 1887. | | |
| *Report | VIII. | Wm. Irelan, Jr. 1888. | | |
| *Report | IX. | Wm. Irelan, Jr. 1889. | | |
| *Report | X. | Wm. Irelan, Jr. 1890. | | |
| Report | XI. | Wm. Irelan, Jr. 1892. ((First biennial.) | $1.00 | $.1 |
| *Report | XII. | J. J. Crawford. 1894. (Second biennial.) | ---- | --- |
| *Report | XIII. | J. J. Crawford. 1895. (Third biennial.) | ---- | --- |

### BULLETINS.

| | | | Price. | Postag |
|---|---|---|---|---|
| *Bulletin | 1. | Dessicated Human Remains.—Winslow Anderson. 1888 | ---- | --- |
| *Bulletin | 2. | Methods of Mine Timbering.—W. H. Storms. 1894 | ---- | --- |
| *Bulletin | 3. | Gas and Petroleum Yielding Formations of the Central Valley of California.—W. L. Watts. 1894 | ---- | --- |
| *Bulletin | 4. | Catalogue of California Fossils (Parts 2, 3, 4 and 5).—J. G. Cooper. 1894 | ---- | --- |
| *Bulletin | 5. | The Cyanide Process: Its Practical Application and Economical Results.—A. Scheidel. 1894 | ---- | --- |
| Bulletin | 6. | California Gold Mill Practices.—E. B. Preston. 1895 | $.50 | $.( |
| *Bulletin | 7. | Mineral Production of California, by Counties, 1894.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| *Bulletin | 8. | Mineral Production of California, by Counties, 1895.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| Bulletin | 9. | Mine Drainage, Pumps, etc.—Hans C. Behr. 1896 | .60 | .( |
| *Bulletin | 10. | A Bibliography Relating to the Geology, Palæontology, and Mineral Resources of California.—A. W. Vodges. 1896 | ---- | --- |
| *Bulletin | 11. | Oil and Gas Yielding Formations of Los Angeles Ventura, and Santa Barbara Counties.—W. L. Watts. 1896 | ---- | --- |
| *Bulletin | 12. | Mineral Production of California, by Counties, 1896.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| *Bulletin | 13. | Mineral Production of California, by Counties, 1897.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| *Bulletin | 14. | Mineral Production of California, by Counties, 1898.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| Bulletin | 15. | Map of Oil City Oil Fields, Fresno County.—J. H. Means | .05 | . |
| *Bulletin | 16. | The Genesis of Petroeum and Asphaltum in California.—A. S. Cooper. 1899 | ---- | --- |
| *Bulletin | 17. | Mineral Production of California, by Counties, 1899.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| *Bulletin | 18. | The Mother Lode Region of California.—W. H. Storms. 1900 | ---- | --- |
| *Bulletin | 19. | Oil and Gas Yielding Formations of California.—W. L. Watts. 1900. | ---- | --- |
| *Bulletin | 20. | Synopsis of Reports of State Mining Bureau.—W. L. Watts. 1900 | ---- | --- |
| *Bulletin | 21. | Mineral Production of California, by Counties, 1900. Chas. G. Yale. (Tabulated sheet) | ---- | --- |
| *Bulletin | 22. | Mineral Production of California for Fourteen Years.—Chas. G. Yale. 1900. (Tabulated sheet) | ---- | --- |
| Bulletin. | | Reconnaissance of the Colorado Desert Mining District.—Stephen Bowers. 1901 | ---- | |
| Bulletin | 23. | The Copper Resources of California.—P. C. DuBois, F. M. Anderson, J. H. Tibbits, and G. A. Tweedy. 1902 | .50 | |
| *Bulletin | 24. | The Saline Deposits of California.—G. E. Bailey. 1902 | ---- | --- |
| *Bulletin | 25. | Mineral Production of California, by Counties, 1901.—Chas. G. Yale. (Tabulated sheet) | ---- | --- |

## PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU—Continued.

Asterisk (*) indicates the publication is out of print.

| | | Price. | Postage. |
|---|---|---|---|
| Bulletin 26. | Mineral Production of California for Fifteen Years.—Chas. G. Yale. 1901. (Tabulated sheet) | ---- | ---- |
| Bulletin 27. | The Quicksilver Resources of California. Wm. Forstner. 1903 | $.75 | $.14 |
| Bulletin 28. | Mineral Production of California, by Counties, 1902.—Chas. G. Yale. (Tabulated sheet) | ---- | ---- |
| Bulletin 29. | Mineral Production of California for Sixteen Years.—Chas. G. Yale. 1902. (Tabulated sheet) | ---- | ---- |
| Bulletin 30. | A Bibliography of Geology, Palæontology, and Mineral Resources of California.—A. W. Vodges. 1903 | ---- | ---- |
| Bulletin 31. | Chemical Analyses of California Petroleum.—H. N. Cooper. 1903. (Tabulated sheet) | ---- | .02 |
| Bulletin 32. | Production and Use of Petroleum in California.—P. W. Prutzman. 1904 | .25 | .08 |
| Bulletin 33. | Mineral Production of California, by Counties, 1903.—Chas. G. Yale. (Tabulated sheet) | ---- | ---- |
| Bulletin 34. | Mineral Production of California for Seventeen Years.—Chas. G. Yale. 1903. (Tabulated sheet) | ---- | ---- |
| Bulletin 35. | Mines and Minerals of California for 1903.—Chas. G. Yale. 1904. (Statistical) | ---- | ---- |
| Bulletin 36. | Gold Dredging in California.—J. E. Doolittle. 1905 | ---- | ---- |
| Bulletin 37. | Gems, Jewelers' Materials, and Ornamental Stones of California.—George F. Kunz. 1905: | | |
| | First edition (without colored plates) | .25 | .08 |
| | Second edition (with colored plates) | .50 | .08 |
| Bulletin 38. | The Structural and Industrial Materials of California.—Wm. Forstner, T. C. Hopkins, C. Naramore, L. H. Eddy. 1906 | ---- | ---- |
| Bulletin 39. | Mineral Production of California, by Counties, 1904.—Chas. G. Yale. (Tabulated sheet) | ---- | ---- |
| Bulletin 40. | Mineral Production of California for Eighteen Years.—Chas. G. Yale. 1904. (Tabulated sheet) | ---- | ---- |
| Bulletin 41. | Mines and Minerals of California for 1904.—Chas. G. Yale. (Statistical) | ---- | ---- |
| Bulletin 42. | Mineral Production of California, by Counties, 1905.—Chas. G. Yale. (Tabulated sheet) | ---- | ---- |
| Bulletin 43. | Mineral Production of California for Nineteen Years.—Chas. G. Yale. 1905. (Tabulated sheet) | ---- | ---- |
| Bulletin 44. | Mines and Minerals of California for 1905.—Chas. G. Yale. (Statistical) | ---- | ---- |
| Bulletin 45. | Auriferous Black Sands of California.—J. A. Edman. 1907 | ---- | ---- |
| Bulletin 46. | General Index to Publications of the State Mining Bureau.—Compiled by Chas. G. Yale. 1907 | .30 | .06 |
| Bulletin 47. | Mineral Production of California, by Counties, 1906.—Chas. G. Yale. (Tabulated sheet) | ---- | ---- |
| Bulletin 48. | Mineral Production of California for Twenty Years.—Chas. G. Yale. 1906. (Tabulated sheet) | ---- | ---- |
| Bulletin 49. | Mines and Minerals of California for 1906.—Chas. G. Yale. (Statistical) | ---- | ---- |
| Bulletin 50. | The Copper Resources of California.—A. Hausmann, J. Kruttschnitt, Jr., W. E. Thorne, J. A. Edman. 1908 | 1.00 | .20 |
| Bulletin 51. | Mineral Production of California, by Counties, 1907.—D. H. Walker, Statistician. (Tabulated sheet) | ---- | ---- |
| Bulletin 52. | Mineral Production of California for Twenty-one Years.—D. H. Walker, Statistician. 1907. (Tabulated sheet) | ---- | ---- |
| Bulletin 53. | Mineral Productions of California for 1907, with County Maps.—D. H. Walker, Statistician. 1908. (Statistical) | ---- | ---- |
| Bulletin 54. | Mineral Production of California, by Counties, 1908.—D. H. Walker, Statistician. (Tabulated sheet) | ---- | ---- |
| Bulletin 55. | Mineral Production of California for Twenty-two Years.—D. H. Walker, Statistician. 1908. (Tabulated sheet) | ---- | ---- |
| Bulletin 56. | Mineral Productions for 1908, County Maps, and Mining Laws of California.—D. H. Walker. 1909. (Statistical) | ---- | ---- |
| Bulletin 57. | Gold Dredging in California.—W. B. Winston, Charles Janin. 1910 | 1.50 | .15 |
| Bulletin 58. | Mineral Production of California, by Counties, 1909.—D. H. Walker, Statistician. (Tabulated sheet) | ---- | ---- |
| Bulletin 59. | Mineral Production of California for Twenty-three Years.—D. H. Walker, Statistician. 1909. (Tabulated sheet) | ---- | ---- |
| Bulletin 60. | Mineral Productions for 1909. County Maps, and Mining Laws of California.—D. H. Walker. 1910. (Statistical) | ---- | ---- |
| Bulletin 61. | Mineral Production of California by Counties for 1910.—D. H. Walker, Statistician. (Tabulated sheet) | ---- | .02 |

## PUBLICATIONS OF THE CALIFORNIA STATE MINING BUREAU—Continued.

Asterisk (*) indicates the publication is out of print.

| | Price. | Postage. |
|---|---|---|
| Bulletin 62. Mineral Production of California for Twenty-four Years.—D. H. Walker, Statistician. 1910. (Tabulated sheet) | ---- | $.02 |
| Bulletin 63. Petroleum Development in Southern California.—P. W. Prutzman. 1912 | $1.50 | .22 |
| Bulletin 64. Mineral Production for 1911.—E. S. Boalich, Statistician, 1912 | ---- | ---- |
| Bulletin 65. Mineral Production for 1912.—E. S. Boalich, Statistician, 1913 | ---- | ---- |

### REGISTERS OF MINES WITH MAPS.

| | | |
|---|---|---|
| Amador County | $.25 | $.08 |
| Butte County | .25 | .08 |
| *Calaveras County | ---- | ---- |
| *El Dorado County | ---- | ---- |
| *Inyo County | ---- | ---- |
| *Kern County | ---- | ---- |
| *Lake County | ---- | ---- |
| Mariposa County | .25 | .08 |
| *Nevada County | ---- | ---- |
| *Placer County | ---- | ---- |
| *Plumas County | ---- | ---- |
| *San Bernardino County | ---- | ---- |
| San Diego County | .25 | .08 |
| Santa Barbara County | .25 | .08 |
| *Shasta County | ---- | ---- |
| *Sierra County | ---- | ---- |
| *Siskiyou County | ---- | ---- |
| *Trinity County | ---- | ---- |
| *Tuolumne County | ---- | ---- |
| Yuba County | .25 | .08 |
| Register of Oil Wells (with map), Los Angeles City | .35 | .02 |

### OTHER MAPS.

| | | |
|---|---|---|
| California, Showing Mineral Deposits— | | |
| Mounted | $1.50 | $.20 |
| Unmounted | .30 | .15 |
| Forest Reserves in California— | | |
| Mounted | .50 | .08 |
| Unmounted | .30 | .06 |
| Mineral and Relief Map of California | .25 | .05 |
| El Dorado County, Showing Boundaries of National Forests | .20 | .02 |
| Madera County, Showing Boundaries of National Forests | .20 | .02 |
| Placer County, Showing Boundaries of National Forests | .20 | .02 |
| Shasta County, Showing Boundaries of National Forests | .20 | .02 |
| Sierra County, Showing Boundaries of National Forests | .20 | .02 |
| Siskiyou County, Showing Boundaries of National Forests | .20 | .02 |
| Trinity County, Showing Boundaries of National Forests | .45 | .02 |
| Tuolumne County, Showing Boundaries of National Forests | .20 | .02 |
| *Mother Lode Region | ---- | ---- |
| Desert Region of Southern California | .10 | .02 |
| Minaret District, Madera County | .20 | .02 |
| Copper Deposits in California | .10 | .02 |
| Nevada County | .25 | .02 |
| Placer County | .25 | .02 |
| Plumas County | .25 | .02 |
| Tuolumne County | .25 | .02 |

### DETERMINATION OF MINERAL SAMPLES.

Samples (limited to three at one time) of any mineral found in the State may be sent to the Bureau for identification, and the same will be classified free of charge. No samples will be determined if received from points outside the State. It must be understood that no Assays, or Quantitative Determinations will be made. Samples should be in a lump form if possible, and marked plainly with name of sender outside of package, post office address, etc. No samples will be received unless charges are prepaid. A letter should accompany sample and a stamp should be enclosed for reply.

THIS BOOK IS DUE ON THE LAST DATE STAMPED BELOW

AN INITIAL FINE OF 25 CENTS

WILL BE ASSESSED FOR FAILURE TO RETURN THIS BOOK ON THE DATE DUE. THE PENALTY WILL INCREASE TO 50 CENTS ON THE FOURTH DAY AND TO $1.00 ON THE SEVENTH DAY OVERDUE.

MAR 21 1960

MAY 23 1966

DEC 12 1988

RECEIVED

DEC 06 1988

PHYS SCI LIBRARY

Book Slip–20m-5,'59 (A2537s4) 458

181590
Calif. Dept. of natural resources. Div. of mines. Bulletin.

Call Number:
TN24
C3
A3
no.64-66

Calif.

TN24
C3
A3
no. 64-66

PHYSICAL SCIENCES LIBRARY

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS
181590

3 1175 01262 5482